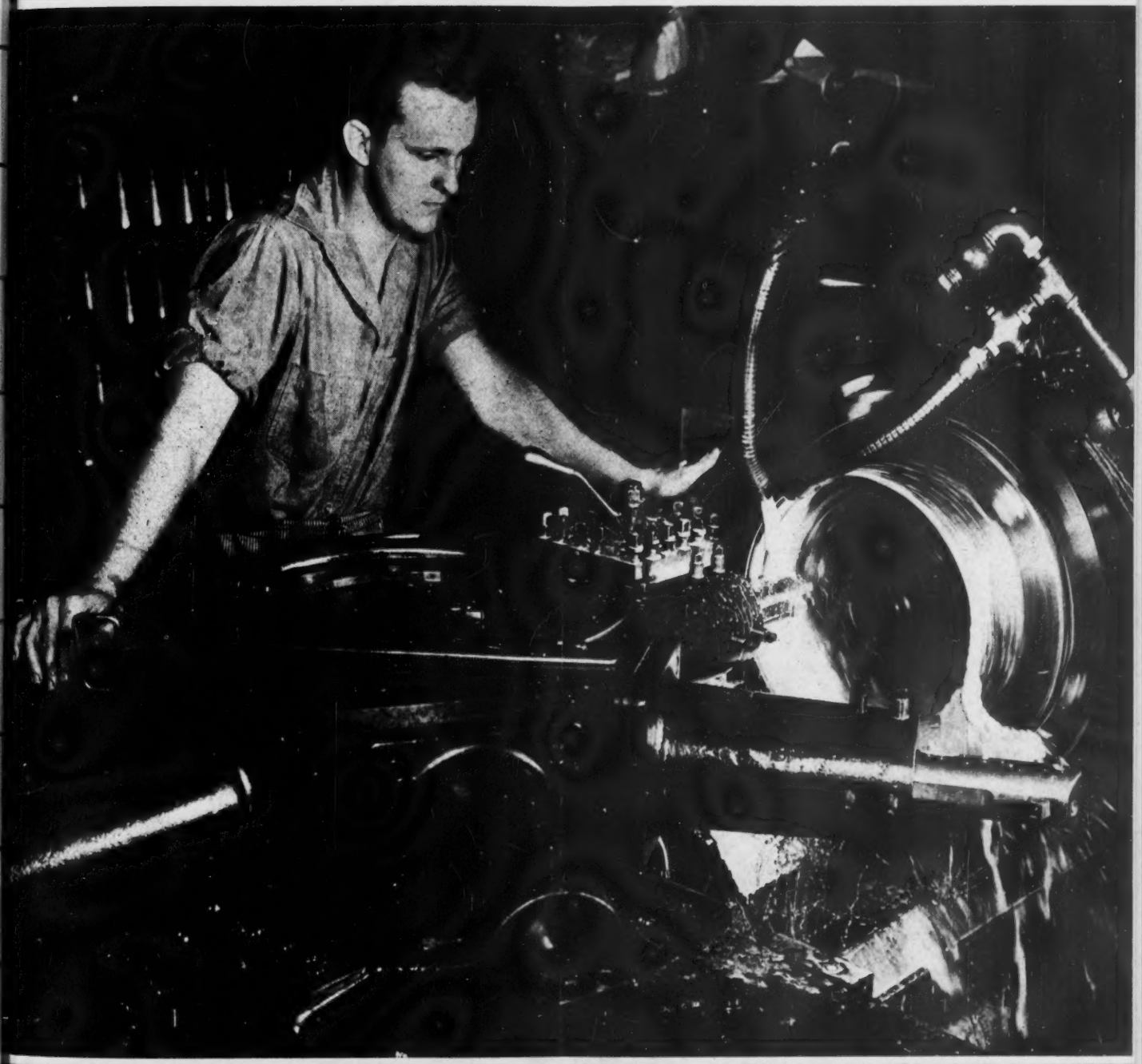
Industrial

Standardization

December 1946



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- U. S. Machine Screw Service Bureau

Screw Industry Stds Com—(Continued)
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Company Members—

Some 2000 industrial concerns hold membership either directly or by group arrangement through their respective trade associations

Readers Write

Recommends Use of Elevator Inspectors' Manual

North Carolina Department of Labor

Gentlemen: I am pleased to advise that our Elevator Inspection Department has been using the American Standard Practice for the Inspection of Elevators, Inspectors' Manual, A17.2-1945, since adopting our Elevator Safety Code in 1939. We find it very practical and wish to express our gratitude to the subcommittee which prepared this Manual for its very splendid work. I am pleased to recommend the use of this Manual to anyone in this connection.

FORREST H. SHUFORD
Commissioner

Antitrust Law Article Widely Distributed

Belleville Fuels, Incorporated
St. Louis, Missouri

Gentlemen: Thank you very much for the April copy of INDUSTRIAL STANDARDIZATION. I am very much interested in the article by James V. Hayes entitled "Standardization and the Antitrust Laws", and would appreciate receiving 30 copies.

R. F. WOOD
Commissioner

Aircraft Industries Association of America, Inc
Washington, D. C.

Gentlemen: If possible, we would like to obtain reproduction copies of the article titled "Standardization and the Antitrust Laws" printed in the April 1946 issue of INDUSTRIAL STANDARDIZATION. It is our desire to distribute this article to our Aircraft, Engine, and Propeller Technical Committees for review in connection with their current study in this matter. It is our feeling that Mr Hayes has given a very thorough analysis of the problems related to standardization and the antitrust laws and, hence, his article could be of invaluable assistance.

J. H. SIDEBOTTOM

War Committee Work A Broadening Experience

The Delaware and Hudson Railroad
Albany, New York

Gentlemen: I am sure that my knowledge of gas and electric welding and cutting operations and of the use of colors in industry was broadened by my experience working with the other members of these two committees (American War Committees on Safety in Electric and Gas Welding and Cutting Operations, Z49, and on Safety

Color Code for Marking Physical Hazards, Z53) and I am grateful for the opportunities which the committee meetings afforded me not only of meeting the members, but also in absorbing some of their knowledge of these subjects which has proven of advantage to me in my work on this railroad.

J. E. LONG
Superintendent of Safety

Belmont Radio Corporation
Chicago, Illinois

Gentlemen: We at Belmont Radio feel that the opportunity to work upon the War Standardization Committees was more of a privilege than a favor as it kept us in contact with the basic thinking which governed much of the production and experimental work we were doing and made it possible to meet many interesting people with whom otherwise we would have had no contact. It is our sincere hope that the impetus which was given to industrial standardization during the war will not be lost now that we are returning to a peacetime footing and that the industrial individualism which has been responsible for so much of American progress will not degenerate into a chaos based upon ill-considered arbitrary decisions. At the outset of the war standardization program I believe that most of us more or less looked upon it with distrust, feeling that it would involve many limitations which would hamper us in creating the ideal designs for a given piece of equipment. As the war progressed and this program became more effective we, in our company, found that standards provided us with much useful application data and assisted our procurement of materials very greatly.

E. WESSELMAN
Component Parts Engineer

Graphical Symbols To Be Publicized

Electrical World
New York, N. Y.

Gentlemen: Information has been received of the approval of the American Standard Graphical Symbols for Electric Power and Control, issued as ASA Publication Z32.3-1946. The standardization of the symbols is a step forward for the electrical industry. To give further publicity to the standards, *Electrical World* contemplates publishing a series of the symbols, probably in the form of some reference sheets and carrying a reference to the American Standards Association's publication number.

R. M. SHOOP
Assistant Editor

Our Front Cover

One of the single-point cutting tools covered by the new American Standard (page 308) in use in a turret lathe. Photo—Warner & Swasey Company.

Industrial Standardization

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Contents

December, 1946 Ruth E. Mason, Editor 35 Cents

The American Standards Association is a federation of national groups dealing with standardization. Through it, government, industry, labor, and the consumer work together to develop mutually satisfactory national standards. It acts as the authoritative channel for international cooperation in standardization work.

Subscription price $4.00 per year (foreign $5.00). Special to schools and libraries $2.00 (foreign $3.00). Re-entered as 2nd Class Matter 7/31/43, at the Post Office, New York, N. Y., Act of March 3, 1879.

The Dow Chemical Company

A magnesium alloy casting being degreased before painting. Fumes of trichloroethylene, used in this degreasing process, may be dangerous to workers if not carefully controlled.

(See article on page 302)

Twenty-Five Countries Set Up New International Standards Organization

Howard Coonley Is Elected President; Headquarters Will Be in Geneva, Switzerland; National Standards Associations Must Vote Approval Before Organization Is Complete

REPRESENTATIVES of national standards associations of 25 countries, meeting in London, October 14 to 26, have set up a new international standards organization. Howard Coonley, chairman of the Executive Committee of the American Standards Association, is president of the new organization, which will be known as the International Organization for Standardization ("ISO" for short). Gustave L. Gerard, staff president of the Belgian Standards Association, is vice president.

It is indicative of the wide trend toward industrialization, and of the increased use of standards brought about by the war, that all six continents were represented—19 European countries; the United States, Canada, and Mexico from North America; Brazil from South America; China and India; South Africa; and Australia and New Zealand.

The representatives of the American Standards Association were P. G. Agnew, vice president and secretary of the ASA, and E. C. Crittenden, associate director of the National Bureau of Standards and chairman of the ASA Standards Council.

The formation of ISO brings together into a single consolidated organization the work of the old International Federation of National Standardizing Associations (ISA) and that of the war-born United Nations Standards Coordinating Committee. It is possible that a third body, the International Electrotechnical Commission, may affiliate as the electrical division of the new ISO, since its governing board has recommended this affiliation.

Howard Coonley

The members of ISO are the national standards bodies of the various countries.

The headquarters of the new organization are to be in Geneva, Switzerland. Many of the delegates had preferred Montreal.

The new International Organization for Standardization has three official languages: English, French, and Russian. This decision was reached only after long, spirited discussions which started at preliminary meetings in New York in October 1945 and in Paris in July of this year. The Russians had pressed vigorously for this recognition of their language.

The ISO constitution and bylaws provide that the governing body shall be a Council containing representatives from eleven different countries. Five of these seats are assigned for a period of five years to the five large countries, China, France, Great Britain, USA, and USSR. This was a compromise, it having been first proposed that these five countries have permanent seats on the Council. The other countries represented on the Council are Australia, Belgium, Brazil, India, Norway, and Switzerland, which will serve for one year.

Howard Coonley, the president of the new ISO, is a former president of the National Association of Manufacturers and the American Standards Association. He was for many years chairman of the Walworth Company, and is still a director of that company. During the war he served as director of the Conservation Division of the War Production Board, and was selected by President Roosevelt as advisor to the Chinese Government in organizing the Chinese War Production Board. He is now devoting his entire time to the American Standards Association as chairman of its Executive Committee.

While technically the new International Organization for Standardization is "provisional", it is starting active work immediately by reviewing the projects and reports of the two predecessor organizations and considering a number of new proposals.

This is made possible by agreement on the part of the United Nations Standards Coordinating

Committee to continue in existence and to maintain its office in London until the office of ISO in Geneva is in a position to take over.

The work of the ISO will be carried out through technical committees upon which any country may be represented if it so desires.

The new organization will be formally completed when its constitution is ratified by 15 national standards bodies.

The countries represented at the conference in London were:

Australia	Netherlands
Austria	New Zealand
Belgium	Norway
Brazil	Palestine
Canada	Poland
China	South Africa
Czechoslovakia	Sweden
Denmark	Switzerland
Finland	United Kingdom
France	United States of America
Italy	Union of Socialist Soviet Republics
India	
Mexico	Yugoslavia

Peace and Human Welfare Goal of World's Engineers

SOME 1,200 engineers from 30 countries attended the International Technical Congress at Paris September 16-21 and went on record to the effect that engineers should coordinate their efforts nationally and internationally to advance human well-being and world peace.

The Congress recommended that engineers organize so that national governments and the United Nations can more easily call upon their services on a scale corresponding to the importance of their tasks. It recommended that a world federation of engineers be organized. As the first step toward such an organization, a new World Engineering Conference was set up as an interim agency "to prepare for the establishment of a more permanent form of organization." The Conference is also to assure the holding of future international engineering congresses and to establish contact with the Economic and Social Council of the United Nations, and with the United Nations Educational, Scientific, and Cultural Organization.

National Committees To Be Members

Membership in the World Engineering Conference is to be held by a national committee in each country. Colonel Aristide Antoine of France, who as chairman of the French Committee had charge of the arrangements for the Congress in September, was elected first president. Representatives of China, Egypt, United States of America, France, Great Britain, India, Poland, Switzerland, and Czechoslovakia make up the first executive board.

Emphasizing the principle that engineers and technicians have a responsibility to themselves in forwarding the progress of humanity, the Congress adopted a summary resolution that declared "it is fundamental that increased attention be paid to the application of engineering science for improving the environment and sustenance of human beings."

"It is therefore necessary," the Congress declared, "to initiate decisive action against the want under which many human beings—constituting an appreciable proportion of the world's population—struggle, and who are thus deprived not only of the primary means of well-being but also of all possibility of spiritual growth."

The Congress declared that engineers and technicians consider it particularly urgent to:

(*a*) Increase the pace of modernizing agriculture with the two-fold aim of increasing the world's food resources and of raising the standard of rural life.

(*b*) Place maximum mechanical and electrical power at the disposal of the individual in order to increase his output both in agriculture and industry.

(*c*) Improve housing for workers and their families by a joint effort of architects and engineers in applying to the construction of lodgings the general progress of arts, sciences, and technology, and in the rapid execution of town plans made under a coherent doctrine.

(*d*) Humanize working conditions in both agriculture and industry by technical studies and accomplishments in accord with the interested parties and by the development of international conventions for the protection of workers.

In order to accomplish these goals, the Congress urges that the activities of individual engineering specialists and those of engineering societies be more closely coordinated nationally as well as internationally and that all engineers keep in close touch with the progress of scientific research. In particular, it urges international cooperation for the spreading of technical knowledge; that nuclear energy be put to peacetime use as quickly as feasible; and that more consideration be given to the essential role of scientific management, including standardization, "which must be developed widely on an international plane in order to offer to the majority of consumers, at constantly lowering prices, easy access to the fruits of technical progress." It also urged a high rate of productivity per man-hour.

Specific recommendations included creation by the United Nations of an administration for housing and community planning under the authority of the Economic and Social Council of the UN, and an International Institution of Scientific Management in connection with the United Nations.

Creation of international technical schools for advanced students was recommended, the first to be installed in Europe to help youths who played an active part in the resistance or who have been victims of Nazism.

World Engineering Federation Urged by Congress

The Congress urged that a World Engineering Federation be formed immediately to permit the collective representation of engineers and technicians before private or official international organizations.

The technical program of the International Technical Congress which resulted in these recommendations consisted of 130 papers by authors from fourteen countries. (For an abstract of the paper about standardization, see page 299.)

C. E. Davies, secretary of the American Society of Mechanical Engineers, served as chairman of the United States committee for the Congress, and was one of the United States delegates.

Copies of the proceedings of the Congress, including summaries of the discussions, are available from the Joint Committee on International Relations, 29 West 39th Street, New York 18, New York.

Standardization—

National and International

Technical standardization can help materially in producing more and cheaper goods and services, better living conditions for the people of all countries, and settled international relations and mutual understanding between peoples, P. G. Agnew, vice president and secretary of the American Standards Association, declared in a paper prepared for the International Technical Congress held at Paris, France, September 16-21. The paper, an abstract from which is presented here, was part of a session on The Present Situation of Engineering in the World. Other sessions in which American engineers and scientists participated covered Engineering Problems of Reconstruction and Economic Development in the World; Atomic Energy; and Engineers in the World, all directed toward the main object of the conference "to emphasize the universal character of the great engineering problems arising out of the reorganization and development of world economy."

C. E. Davies, secretary of the American Society of Mechanical Engineers, was chairman of the United States committee for the Congress.

Dr Agnew's paper is of particular interest in view of the recent conference of national standards bodies at London that set up the new International Organization for Standardization.

By P. G. Agnew

THE development of the world economy demands more and cheaper goods and services, better living conditions for the general populace of all countries, leisure in which to pursue worthwhile cultural objectives, settled international relations and mutual understanding between peoples. Technical standardization can help materially in the achievement of these ends.

An inevitable future tendency in the interdependence of the different branches of engineering will be the broadening of the standardization movement, both nationally and internationally. This is already taking place. New groups are undertaking standardization and new institutions charged with the formulation of technical standards are being organized in countries whose industrial development hitherto did not call for such activities. Both the new and the old national standards bodies are affiliating for international work.

Modern standardization began in individual industrial plants and its adoption made possible the use of interchangeable parts—the basic principle on which the great structure of mass production now rests. There followed standardization by groups, such as those constituting single industries, and eventually standardization throughout whole nations with respect to a vast number of technological products and functions. National standardization presents a striking example of the interdependence of the different branches of engineering activity. The execution of a single modern engineering project of any considerable magnitude requires the application of technical standards developed by members of all branches of the engineering profession. For example, a hydroelectric power project involves a large variety of construction materials and procedures, many mechanical devices, and electrical equipment and installations of the most advanced types. Not only the civil, mechanical, and electrical engineer, but the chemist, the metallurgist, and other technologists have contributed to the standards employed in the design, construction, and operation of such a project.

The body of national standards in an industrialized country, such as the United States of America, embraces standard specifications and methods of testing materials and equipment, standards of size and shape for a multitude of elements entering into manufactured products or manufacturing operations, codes and regulations stipulating practices to be followed for the safeguarding of life and property, technical terminology and symbols, as well as

fundamental equivalents, definitions, and concepts. These standards penetrate into and serve all the spheres of activity concerned with the development of world economy for the benefit of mankind. Their expansion therefore becomes one of the means of fostering this essential development.

The trend of national standardization today is comparable in one respect with the trend after the world war of 1914 to 1918, following which many of the now existing national standards bodies came into being. In many fields the direction of advance of standardization work is now, as it was then, dictated by the economic necessities and practices of the individual countries, and what they presume to be their needs from the standpoint of national defense. In many countries it is being applied as a partial remedy for a critical economic situation, for the want of certain types of materials, for economy of productive effort, or for other reasons.

Expect More Standards To Help Production

The trend of standardization to be anticipated in the United States is toward the establishment of more standards facilitating the production and marketing of industrial goods, economy in the use of materials, elimination of unnecessary sizes or types of products, more efficient control of quality, and broader application of standardized safety principles. Since some of the largest industries of the country conduct their operations in a manner which involves the supply of parts by hundreds of separate and independent factories the interchangeability of the products of these factories is essential, and standardization of such requirements as tolerances, for example, becomes imperative. Again, the control of quality in manufacturing processes presents an opportunity for the application of standardization of inspection and testing procedures. Coordination of the dimensions of building materials has begun auspiciously and should result in substantial economies in construction. The extension of standardization to consumer goods on an enlarged scale is to be anticipated, to the ultimate benefit of both consumer and producer. Rapid wartime changes in materials and processes involve new specifications, new terminology, and new methods of testing. The national defense, also, demands uniformity and interchangeability in the products of many factories, which can only be achieved by setting up standards of many kinds.

A trend of standardization to be encouraged and developed in every way possible is in the direction of deliberate planning of future standardizing activities. In the past, standardization has too often, if not almost in its entirety, been curative in principle, being carried out only when the object or operation to be standardized had reached such a state of confusion that simplification became necessary as a preliminary to standardization. Planned standardization would largely eliminate the need for simplification. Technical progress would be accelerated by avoiding the lost time and effort involved in producing goods of sizes, grades, or other characteristics ultimately to be discarded. Such advance planning could not be perfect and there would be some subsequent "natural selection" among the standards so developed, but its economic advantages are obvious.

Present Situation and Trend of International Standardization

The type of international standardization to be considered here is the unification, or bringing into concord, of existing or proposed national standards, rather than such standardization as the adoption internationally of units of time, weight, or length. Both these types of standardization have been carried out for many years, the former by specialized groups, particularly those having to do with transportation and with electrical engineering problems, but general international cooperation in standardization only followed the organization of the national standards bodies after the first world war. However, it developed with considerable rapidity and at the beginning of World War II the membership of the International Federation of National Standardizing Associations (ISA) included the national standards bodies of 22 countries. The work of ISA was then being carried on through 47 technical committees and a large number of subcommittees.

Among the projects of ISA were a number in the mechanical field worthy of particular mention. The ISA tolerance system described in Bulletin 25 covers tolerances, fits, and gaging specifications, and was adopted by 16 of the European countries. The work of the ISA technical committee on ball and roller bearings, the secretariat of which was in Sweden, was both extensive and important. The technical committee on metric threads, with its secretariat in Switzerland, succeeded in systematizing certain series of metric threads, and also dealt (in Bulletin 27) with screws and nuts having these threads. The status of all ISA projects is now the subject of study, and work will be resumed on those considered to be of sufficient importance.

International Electrotechnical Commission Active Since 1906

Up to the beginning of the recent war international standardization in the electrical field had been pursued by the International Electrotechnical Commission (IEC) from the time of its formation in 1906. This work was necessarily interrupted during the war. The national committees of the IEC are representative of the electrical industries of the countries (26 in number prior to the war) constituting its membership, and form a strong and efficient organization for international standardization in the electrical field.

Some of the standards and recommendations of the International Electrotechnical Commission were of considerable importance in the international field. The International Standard of Resistance for Copper, issued in 1925, is an example, though present-day refining methods make the production of grades of copper suitable for electrical purposes comparatively easy. The IEC Rules for Electrical Machinery, the fourth edition of which was published in 1935, provides for standards of temperature rise and uniform methods of testing, which are essential to international commerce in electrical machinery. The International Electrotechnical Vocabulary, published in 1938, was widely accepted in European countries and elsewhere, though to a lesser extent in the United States. The IEC had many subjects under study at the beginning of the war and its national committees are now reviewing these with a view to resuming work on those of importance for the future.

The earlier years of the war demonstrated—sometimes in a spectacular, and unfortunately costly, manner—the serious drawbacks due to lack of uniform technical standards

in the industrial countries producing supplies and equipment for all the Allied armies. The greater uniformity among the standards of the countries supplying the enemy forces only served to emphasize the situation. Under these circumstances the natural procedure was to set up an organization to coordinate those standards of particular importance to the prosecution of the war.

The United Nations Standards Coordinating Committee (UNSCC) was formed with the object of promoting the maximum possible coordination and unification of standards necessary for the war effort and the immediate postwar period.

The war ended before the UNSCC had come fully into operation and it therefore had no opportunity to contribute to the unification of standards for war production. Its attention has consequently been devoted to the initiation of work of value to the postwar period, to setting up committees for new lines of endeavor arising out of changed world-wide conditions, and to preparations for the formation of an international standards organization to deal with the entire field of standardization, preserving the useful work already done by the International Standards Association (ISA) and the International Electrotechnical Commission. [See page 297.]

Twenty Projects Proposed For International Study

Some 20 projects have up to the present time been proposed for study by members of the United Nations Standards Coordinating Committee. Among these may be mentioned: the moisture regain of wool, proposed by the Australian member; textile test methods, proposed by the United States; high voltages, proposed by France; and radio interference, proposed by Great Britain. Others are the chemical analysis of manganese ore and safrol oil, both proposed by Brazil; unification of certain building standards, proposed by France; and boiler construction codes, proposed by South Africa. The list includes important products entering into international commerce, and it is to be anticipated that the number will rapidly increase with the consolidation of international standardizing activities in the hands of a single organization.

It cannot be said that international standardization has kept pace with the national technical standardization movement in industrial countries. International work of this character is always slower and generally corresponds to a less advanced stage of technical progress. Also, the obstacles to be overcome are greater where a variety of basic standards of weight and measurements are involved, and where different conceptions of the ultimate goal of standardization may sometimes exist.

Standardization and Technical Progress

A lengthy dissertation on the relationship between standardization and progress in the technical arts would not be in order here. But the importance of the extension of standardization—both national and international—to technical progress can appropriately be mentioned. Technical progress depends, among other things, on the concerted efforts of technicians to develop new and better processes and products, and also on the ability of the markets to absorb the output of producers. A standardization program in step with accelerating technological developments will save the time that would otherwise be spent later in bringing order out of a haphazard development of products, and allow that time to be devoted to progressive work. And it will contribute materially toward that economy in production which is essential for the reduction of costs and the maintenance of maximum consumption.

The present need for more scientists and technicians in many countries has received much attention and publicity. Effective, planned standardization provides one means of obtaining increased efficiency in technological development. So, too, the diffusion of knowledge through international cooperation in standardization can be regarded as another means of stepping up the efficiency of the world economy, and helping to raise the standards of living of all peoples.

The great number of new products and materials developed during the recent war afford tremendous scope to the standardization movement. By contributing to the availability of goods and services, standards can aid in the rehabilitation of devastated countries and the progress of the world as a whole.

The development of a world economy exacts from the engineering profession increasing interdependence among its branches, with consequent broadening of the standardization movement, which is closely related to the work of all of them. National standardization is an element in the rational organization of industry and technology for national progress and defense. Standardization in the international field can benefit international commerce and technological advancement, while at the same time contributing its share toward the creation of better understanding among nations. Technical progress—national and international—can benefit from the advantages flowing from the economy of effort resulting from industrial standardization.

Technical standardization may properly be regarded as a tool available to perform useful work in the shaping of a world economy calculated to provide more fully the material necessities, while at the same time leaving leisure for the pursuit of the less tangible aspects of human advancement.

Preparing New Dictionary Of Motion Picture Terms

A glossary of terms used in the motion picture industry is now being compiled by the Society of Motion Picture Engineers. When completed it will be presented to the American Standards Association with the request that it be published as the American Standard Definitions of Motion Picture Terms, J. A. Maurer, vice president of the SMPE, announces.

ASTM Meetings In February, June 1947

The American Society for Testing Materials announces the dates for its national meetings in 1947 as follows:

1947 Spring Meeting and Committee Week, Philadelphia, February 24-28

1947 (Fiftieth) Annual Meeting, Atlantic City, June 16-20

The technical feature of the Spring Meeting is to be a symposium on testing and evaluation of paints and paint materials, under the joint sponsorship of the Society's Committee D-1 on Paint, Varnish, Lacquer and Related Products, and the ASTM Philadelphia District.

Limit on Trichloroethylene Defined to Protect Workers

A NEW tool in the continuing fight of industrial medicine, labor, government, and other interested groups on air contamination harmful to industrial workers has been made available as an American Standard. It covers the safely permissible concentration of trichloroethylene, a common degreasing agent whose fumes are dangerous in excessive quantities to factory personnel.

A sectional committee under the general chairmanship of William P. Yant, director of Research and Development, Mine Safety Appliances Company, prepared the Standard, basing its work on a study which was initiated in 1943. The committee concluded that concentrations of trichloroethylene exceeding 200 parts in one million parts of air were dangerous to workers and recommended test procedures to assure that such concentrations were not exceeded under working conditions.

Although commonly used as a solvent, in dry cleaning, and as a degreaser in factories, trichloroethylene in sufficient concentration has narcotic properties similar to chloroform. Prolonged or frequent exposures to the fumes at concentrations greater than 200 to 1,000,000 in the air tend to cause nausea, dizziness, headache, and lethargy; they may injure the central nervous system and possibly the liver, the committee's study indicated.

Industrial Hygiene Association Sponsored Study

Study of the effects of trichloroethylene with a view to setting the safety standard was sponsored by the American Industrial Hygiene Association. Representatives of 17 other associations and government departments, as well as 14 members-at-large interested in the problem, finally approved the standard, which is now offered for general use by industry. The original draft of the standard was prepared by a subcommittee headed by Frank S. Low, of Westvaco Chlorine Products Corporation.

The new standard is the seventeenth voluntarily arrived at by interested groups through machinery of the American Standards Association in the field of air contamination by dust, fumes, mists, vapor, and gases which are potentially harmful to workers. These include four developed especially as American War Standards: those for manganese, metallic arsenic and arsenic trioxide, xylene, and styrene monomer. Others include such common industrial substances as carbon monoxide, hydrogen sulfide, benzene, lead and its inorganic compounds, methanol, and formaldehyde.

Wright Aeronautical Corp

Here a closed conveyor protects the worker from exposure to trichloroethylene. The conveyor carries the cylinder heads into and out of the solvent; fans within the machine exhaust injurious fumes.

ASA Engineers to Help With Safety Convention

Henry G. Lamb and Daniel F. Hayes, safety engineers of the American Standards Association, have been asked to serve in an executive capacity at the 17th Annual Safety Convention and Exposition of the Greater New York Safety Council scheduled for March 25 through 28, 1947.

Mr Lamb will act as one of two general vice chairmen of the Convention, while Mr Hayes has been asked to serve as vice chairman of the program committee.

In addition, Mr Hayes has been elected to continue as chairman of the engineering committee of the Metropolitan chapter of the American Society of Safety Engineers.

Latest Organizations To Become ASA Members

The national standardization program has been given added impetus by the participation of the following companies and individuals as new members of the American Standards Association:

Ansbacker Siegle Corporation, New York, New York
Anti-Corrosive Metal Products Company, Inc, Albany, New York
Atlas Bolt & Screw Company, Cleveland, Ohio
Brightman Nut & Manufacturing Company, Sandusky, Ohio
Buffalo Bolt Company, North Tonawanda, New York
Clark Brothers Bolt Company, Milldale, Connecticut
The Champion Rivet Company, Cleveland, Ohio
The Esmond Mills, Inc, New York, New York
Federal Screw Works, Detroit, Michigan
The Glidden Company, Cleveland, Ohio
Littlefuse, Inc, Chicago, Illinois
Marion Power Shovel Company, Marion, Ohio
Monsanto Chemical Company, St Louis, Missouri
The National Lock Washer Company, Newark, New Jersey
National Supply Company, Pittsburgh, Pennsylvania
Pittsburgh Forgings, Pittsburgh, Pennsylvania
Pittsburgh Screw Bolt & Nut Corporation, Pittsburgh, Pennsylvania
Ring Screw Works, Detroit, Michigan
Rockford Screw Products Company, Rockford, Illinois
Vulcan Rivet & Bolt Corporation, Inc, Birmingham, Alabama
Wellington Sears Company, Boston, Massachusetts
Charles C. Platt, New York, New York
Lt Col Carlos de Proenca Gomes Sobrinho, Rio de Janeiro, Brazil
Surell Goldberg, Philadelphia, Pennsylvania

Standards in Governmental Buying

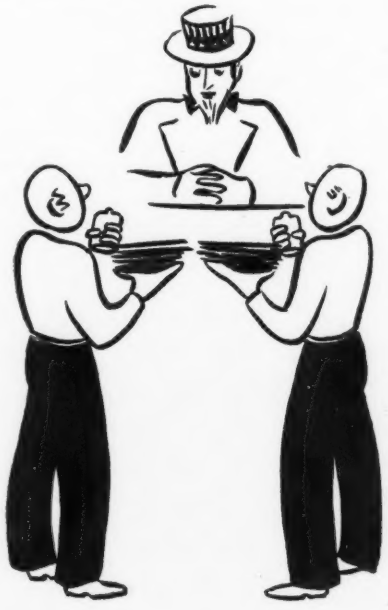
By Clifton E. Mack

Clifton E. Mack, Director of Procurement, U. S. Treasury Department, here describes how the Federal Government uses standard specifications to implement its centralized purchasing policy. Mr Mack shows how the Government's standards have resulted in important savings in terms of service as well as in the immediate cost of the product.

WE have gone a long way on the road to standardization. And with each step forward this nation has become more and more prosperous. Yet we have not tapped all potentialities. Many economists believe that more standardization will give greater impetus to mass purchasing. They believe that when equipment of one manufacturer is interchangeable with that of another, waste will be reduced to a minimum.

On the other hand, many producers purposely avoid standardization with competitive products because they want the consumer to ask for their product by trade name and they spend very substantial amounts of money to accomplish that purpose.

The purchasing agent, however, is dependent upon competitive goods to do the best buying job. His means of obtaining competition is through standards—The Purchase Specification.



What happens when no specification is in existence and a purchasing agent is told to buy a thousand gallons of paint suitable for wall covering? He might find on the market that there were 100 different brands and types of paint which might presumably meet his needs. The price might range from 50 cents to $5.00 a gallon. On the basis of dollar and cents expenditure, he might buy the cheapest brand and let it go at that. On the other hand, he might purchase the most expensive brand on the theory that he would be getting the highest quality obtainable. But regardless of which of these two selections he makes, he has only the remotest chance of purchasing the product which is best from the standpoint of true economy—that is, getting the utmost in terms of use.

That is the principle which guides the activities of purchasing men today. In the Federal Government, we are concerned with service and quality first. It is fundamental, we have learned, that the article purchased must be the most suitable for the intended use and that it will not be the most expensive dollarwise.

Acceptance of such thinking led to centralized purchasing in the Federal Government. But a long and expensive road was traveled before a move was made in this direction. Back in 1905 the Keep Commission was created to investigate the purchasing activities of the Federal Government. The following year the commission reported, for example, that there were 133 different kinds of pencils, 28 kinds of ink, 286 varieties of pen points, and 11 distinct categories of typewriter ribbons being bought by the various departments. The Commission reported also, that while one agency was paying $1.70 for a certain type of ink, another agency was paying $3.00 for the same type; that ordinary pencils of identical quality cost $2.27 to $3.36 a gross; and that the same quality glue was being purchased at prices ranging from $1.84 to $3.00.

The Keep Commission was concerned, too, with the fact that specifications in existence had only limited acceptance. It found that the samples of prospective purchases submitted to the government generally were only superficially inspected and that tests were either lacking entirely or inadequate. As a result, the government not only was unable to award upon best adapted qualities but lacked, as well, definite indexes as to quality upon which to base an inspection system.

For many years the Federal Government has recognized that standardization is requisite to sound centralized purchasing. With the establishment of the Procurement Division

in 1934, the Federal Government placed in one agency not only the over-all responsibility of formulating buying policies but of developing standards and specifications for articles, materials, and equipment used in two or more agencies. We do not attempt to standardize all articles used by the government, since an agency may have need for a commodity which is peculiar to itself, and may justifiably deviate in whole or in part from the competitive standard. Those are the exceptions, however, and not the rule.

NOTE: This article is abstracted from an address presented by Mr Mack before the first annual convention of the National Institute of Governmental Purchasing, August 21, 1946.

But on items where there is common need, we have developed standards, for they are fundamental to efficient purchasing. Thus we are able to consolidate requirements of the various using agencies, and instead of buying piecemeal, we can buy in large quantities. The advantage, of course, is increased competition, lower unit costs, and during normal times better delivery service. Insofar as warehousing is concerned. standardization reduces the number of items to be carried in stock and permits larger quantities of each item to be kept on hand without increase in storage space. Another advantage that accrues is a reduction of the number of emergency purchases which ordinarily are for smaller quantities at higher unit prices.

Can Specify Right Products and Buy on Best Terms

Boiled down, standards and specifications are the fundamental tools which we use in order to accomplish our work. It enables us to specify the right product, to buy it on the best terms as to price and delivery and, through inspection, ensures that the product received is the one specified.

Actually, a specification is a statement of the user's needs and what the manufacturer is required to supply. If, however, a product cannot be checked against the spelling out of the quality, the specification is worthless. More than that, it is an obstacle to good buying for it paves the way for misunderstanding between the buyer and the supplier. Accordingly, the language of a purchase specification must be clear, specific, and not susceptible to more than one meaning, otherwise there is no basis for impartial evaluation.

In all specification work there are two main factors to be considered; namely, first, what the standard should be, and second, how to make it effective. With respect to the first factor, I think you should know how Federal standard specifications are developed in the Federal Government and something about the organization required for such an undertaking.

Back in 1921, the first Federal Specifications Board was created under the Director of the Budget. In 1934 it was transferred to the Procurement Division. It is composed of representatives of the major departments. For example, I have appointed Dr Edward U. Condon, Director of the National Bureau of Standards, as chairman of the Board and Willis S. MacLeod, Acting Deputy Director of the Standards Branch of the Procurement Division, as vice chairman. The Board supervises the activities of 76 technical committees which are made up of approximately 700 technicians of the Federal Government. Each technical committee does the spade work in drafting specifications on the commodities assigned to it. Thus far, as a result of their labor, some 1750 Federal Specifications have been developed. But there still remains a stupendous task to do on specifications prepared by various agencies of the government. Many of these must be standardized for the use of the entire government. In addition, present Federal Specifications must be constantly reviewed to take advantage of new products which have been developed.

No specification is worthwhile unless it can be lived up to, and for that reason, an Industry Advisory Council was created early this year to assist in the development of Federal Specifications. The Council is composed of leaders in industry and in nationally recognized technical and professional societies. Thus, by gaining the viewpoint and technical participation of industry, we can develop Federal Specifications which conform to our requirements as well as to industrial practices. The council is proving itself an effective medium for bringing together the mutual interests of the Government and industry and for keeping the government informed of new developments, improved practices, and manufacturing processes.

Technical Committee Avoids Unnecessary Requirements

In the preparation of Federal Specifications, the technical committee concerned first decides upon the properties of the product necessary to meet the desired use, and the method of determining these properties. Special care is taken so that unnecessary requirements do not creep in and make the specification too cumbersome. After the specification is written, it is sent to all departments and agencies for comment and suggestions. The process does not stop there. The Industry Advisory Council members review the draft also. The draft is then sent to the various producers of the item for their comment. The comments from these various sources are then considered, the preliminary draft is modified, where necessary, and the final specification is issued. It then becomes mandatory upon all Government agencies.

I would like to emphasize that the most important comment is that of industry. Industry can tell whether it can produce an article to meet the specification and, if not, what can be furnished. We have received many valuable suggestions calling for minor changes which do not interfere with the use of the product yet permit commercial products to be furnished instead of special grades. Wherever that is done, the cost per unit is reduced materially.

During the war, because of shortages of materials, Federal Specifications were relaxed for many nonmilitary items, in order to minimize and in some cases entirely eliminate the use of scarce materials from nondefense use. Emergency alternate specifications were issued. For example, we found it necessary to relax our specifications for typewriter ribbons because ribbon cloth also is balloon cloth and the Army and Navy needed balloons. Instead of using zinc, chromium, bronze, cork, nickel, and a host of other critical materials, our technical committees decided on substitutes which could be used. As a result, many manufacturers, faced with the prospect of closing down because they were unable to buy critical materials for nonmilitary items, continued to produce by using the substitutes mentioned in the emergency alternates.

In this connection, I might mention that we relaxed specifications for many types of office furniture.

For example, the armed forces needed 150,000 filing cabinets during the war. Steel was needed for arms, and ships, and tanks. Since our objective as a buying agency is to obtain the greatest value in terms of use for dollars expended, we decided that wood filing cases would fill the bill. They did—and we bought them.

Although specifications are divided into several categories such as construction, material, design, and performance, from the viewpoint of the purchasing man the ideal specification is one that covers performance solely. In the last analysis, performance is what we are after. Suppliers then have complete competitive freedom in designing and styling the commodity as well as its construction and the materials which go into the item. Under a performance specification, it is clearly stated what the conditions are under which the material is to be used, how it is to perform in measurable terms in meeting that service, and such other features as are necessary to satisfactory installation and operation.

Performance Specifications Best for Assembled Articles

But experience has taught that performance specifications are best applied in the general field of assembled articles. For example, the specifications for electric motors are concerned with the type of motor to be used, its current and load characteristics, the voltage, the speed, and its suitability for a given service. Although certain incidental requirements may be included consistent with the using condition, the manufacturer virtually has complete freedom to construct the motor within the framework of the engineering performance required. This is true for oil burners, control instruments, electrical supplies and equipment, pumps, elevators, boilers, and automobiles.

On the other hand, such commodities as chemicals, textiles, and steels are best controlled by a combination-type specification covering construction and material. The Federal Specification covering bleached cotton bedsheets is an example of such a combination. The physical characteristics of the sheeting material, such as the number of threads per square inch, sizing, the weight of the fabric per square yard, stitching, and hems, are spelled out. Within these terms, the supplier may use whatever grade of cotton he desires, but it must have the characteristics stipulated. In specifications for steel products, we stipulate the chemical composition and its physical properties.

Where interchangeability or a specialized application must be met, the specification writer is forced to resort to restricting design. This is true in the case of certain tools where, for reasons of skill, safety, and utilization, a special design is considered best suited to working conditions. This latter, of course, narrows supply, frequently discourages initiative, and increases costs because of the specialized nature of the article. The design specification should be avoided, where practicable, to broaden supply and reduce costs.

I have said before that any commodity we buy is from the standpoint of getting the utmost in terms of use. That is where the specification writer and the purchasing man work hand in hand. The specification writer must consider the use, conditions, and the qualities of the product. He must take into account the relative economy of the article based on the cost-service-life of the various grades. Consequently, specifications of all types stipulate the class or grade of material which is to be furnished by the supplier.

The writing of a specification is not a task that can be performed at any one time and be considered complete. With all the new developments of the war, many specifications have now become obsolete. And the specification that reflects the best practice today may be inadequate a year from now. Specifications must change from time to time, so they are coordinated with changes both in the requirements of the user and in manufacture. Very often, there is a tremendous reduction in unit cost.

Specifications Reduced Price for Venetian Blinds

For example, we formerly paid 36.7 cents per square foot for Venetian blinds, but the price was reduced through specification technique to 20 cents a square foot. Another instance is the case of indelible ink. We developed a specification which brought the price down from $1.10 a quart to 35 cents a quart. And ink is a very important item in governmental use—as you all know—so the savings to the taxpayer will be substantial. There are hundreds of examples. The price of spar varnish was reduced 75 percent as a result of specification requirements.

Over a period of years, the Government will save millions of dollars on purchases of carbon and stencil paper because of specifications which have been developed. On stencil paper, the requirements were so written that it was possible to get competition, whereas formerly the government was buying from one supplier. As a matter of fact, stencil paper until a few years ago was a proprietary item. Today as a result of the specifications developed, a number of companies have entered the field.

Purchase from Manufacturer Saved Money for Government

One example of specification technique, which became very profitable to the government, may be seen in the purchase of offset duplicating machine supplies. For years the Government had purchased its offset supplies as proprietary items. It was customary to buy the whole process from one company which sold accessories, supplies, and the machine. What actually happened was that the company bought the accessories, such as cameras and arc lamps, from a manufacturer and then sold the items as part of the process, naturally with a mark-up.

This is what was done. We stopped buying the accesories from the company and bought them directly from the manufacturer; thus saving the mark-up. But more than that, we rewrote the specification so that it was opened to other bidders. We then were able to get competitive bids. The result, a saving of about $311,000 annually.

This case, I am sure, will be of interest to everyone, particularly purchasing men, who are located in districts where there is a heavy snowfall each year. Up until a short time ago, we had three types of tire chains on the General Schedule of Supplies, which is a form of open-end contract, permitting each government agency to order directly from the manufacturer without the necessity of going through the time-consuming effort of asking for bids. The types were: first, the standard tire chain which was bought at the lowest price; second, the extra heavy which was the most expensive; and third, the reinforced tire chain which ranged in price somewhere between the first two.

But we were not sure that we were getting value in relation to the price difference. An attempt was made to get information from the manufacturers. But they didn't know or wouldn't tell us. We decided to make a wear test. We obtained the cooperation of the National Bureau of Standards and, at first, we were under the impression that the test could be finished in a month. But it lasted an entire year. The result, I assure you, was certainly worth it. This is what we learned after testing samples of the three grades of tire chains on a truck run up and down the Mt Vernon Highway for a solid year: First, extra heavy chains were practically no better than the standard grade; and second, the reinforced (medium price) chain, wore on the average of 165 percent better than the other two.

The eight manufacturers who had supplied the samples were invited in and informed of the results. We then drew up a Procurement Division specification for the reinforced chain only and that is the only grade we now contract for under the General Schedule of Supplies.

In 1940, $167,000 worth of standard and heavy duty tire chains were purchased through the General Schedule of Supplies. If only reinforced chains had been purchased, the same chain mileage could have been bought for $80,291. At the same time there would have been a saving of approximately 530,000 pounds of steel.

Committee Plans 150 Specifications in Electrical Field

As a result of problems which showed up during the war to plague us, we have a tremendous job ahead in developing specifications. For example, in the field of electrical supplies the technical committee has some 150 specifications to prepare. These involve wires and cables, electrical power equipment, control equipment, electronic equipment, and many others. It virtually covers the field of electrical items.

Then there are plastics. This is an entirely new field. And the technical committee in these products has a very difficult problem to correlate and unify test methods and to determine if requirements should be based on composition, performance, or a combination of the two.

There have been many new developments in paints. A careful reexamination must be made of existing specifications and development of new ones. The paint technical committee has to consider the merits of some high-gloss water emulsion paints which are quick drying and washable and are in a field comparatively new to paint manufacturers. It has to look into the synthetic compounds and metal primers.

Our packaging committee is collating information on standards for packing which is to be made available to all the committees. This is a very broad field in itself. It means money saved in transportation as well as a reduction of loss to manufacturers resulting from return of damaged goods. Right now we have under consideration a specification for wire-bound boxes, crates and crating, shipping bags, and those other incidental problems, such as how best to define the commodity under the freight classifications so as to obtain the lowest shipping rate. I am sure that all of you have seen evidence of inadequate packaging because of shortage of materials. On the other hand, you have also seen concrete examples of overpackaging at the expense, of course, of the purchaser. We in the Procurement Division feel strongly that much needs to be done to our specifications in this direction.

I do not think it necessary for me to mention in detail the importance which adequate test methods, testing, and inspection have in the management of purchase specifications. As I see it, each phase of purchasing is

New Trends May Help Public Buying

The National Institute of Governmental Purchasing has come upon the scene at a most strategic time and is now in a position to exert strong and effective leadership in the use of standards in the purchasing activities of public bodies, P. G. Agnew, vice president and secretary of the American Standards Association, told the Institute at its meeting August 19-21. The Institute has an opportunity, he said, to bring this "badly neglected field of activity into effective relation with the standardization movement as a whole."

Two important developments point to trends that offer opportunity for constructive work for the Institute, Dr Agnew said.

The first of these is what has come to be known as quality control. "This fundamental production technique is based on a new and scientific method of sampling," he declared. "One remarkable result of this new method is that it makes the record of a mass production machine—as, for example, a machine which makes incandescent electric lamps—of greater importance in the control of the quality of the product than traditional sampling and test methods to be found in the ordinary garden variety of specifications. For such reasons, it is likely that these new developments will lead to the revision of the sampling and inspection methods of many, if not most, existing purchase specifications."

The second important trend to which Dr Agnew referred is the increased use of certification and labeling methods in the marketing of products. "After years of study," he said, "one large and important trade association has arrived at a policy of making available systematic methods of certifying and labeling the products of its members. Several industrial groups are already using this method as the basis of their marketing programs. The ASA has been urged to lend its assistance in furthering the principle of certification labeling and also in its actual practice. The ASA has a committee studying the entire subject.

"If a general plan of certification should come into wide use, it would be of great value to the smaller governmental units that cannot afford to maintain inspection staffs."

important but one should not dominate the other. The specification writer should spell out the need, the purchasing man should buy for the need, and the inspector should see that the user gets what he buys.

Our Federal Specifications Board is taking up the subject of inspection and test methods, obtaining the views of the men actually doing the work, for the Board feels that a re-examination of test methods, and number of tests required will prove fruitful.

Standard Stock Catalog Provides Uniform Storage Policies

Speaking of standards our Standard Stock Catalog makes possible classification and uniformity of policies with respect to storage and issue. Approximately 600,000 items are listed in the reference catalog which is a major responsibility of the Procurement Division. Compilation was begun in 1929 and the catalog now covers many of the common items used by more than one agency of the Federal Government. Each item listed carries a code number and is thus precisely identified for the information and convenience of every officer and employee engaged in this work.

Duplication in Warehouse Practices Can Be Eliminated

A continuous effort to further standardize warehousing methods is put forth by the Procurement Division. Recently we completed a survey to systematize storage and issue in such fashion that the number of storage sites could be consolidated and reduced. With uniform nomenclature and uniform methods of storage and issue, made possible through improvement of the Federal Catalog, it has been found that such duplication could be eliminated in warehouse practices.

We now are engaged in studying contract forms used in the Government. Although they are now standard in form we desire to simplify them and remove points of ambiguity.

Wherever repetitions occur we have either standardized a practice or are attempting to do so.

All of the changes we are making in standards and specifications, and those we contemplate, have been motivated by a very simple philosophy —to get the utmost in use for dollars expended. In that way we keep abreast of changing conditions, and perform for the Government, as well as for the taxpayers, the job we were set up to do.

Advertising Associations Recommend Standard Practice for Ordering Ads

STANDARD practices for ordering, publishing, and billing advertisements were announced by two different advertising associations recently.

A standard order blank has been made available by the American Association of Advertising Agencies and the National Association of Transportation Advertising, Inc, to facilitate the placing and handling of transportation advertising. In addition, a standard for ordering and billing newspaper advertising was given unanimous approval at the meeting of the Newspaper Advertising Executives Association in June. This standard requires "That the advertiser and/or agency shall designate the width in columns and exact depth, in which case the newspaper agrees to publish and bill the advertisement in exact space ordered; measurement to be from cut-off rule to cut-off rule."

An adequate space standard has long been needed to settle disputes involving advertisements prepared in plate or mat form which occur because of the shrinkage in the newspaper mechanical process, the announcement of the Association's action declares. In urging adoption of the standard, the Association believes that it will benefit advertisers, agencies, and newspapers by:

(1) Effecting greater economy of operation on the part of agencies and newspapers through the reduction of billing, checking, and bookkeeping expenses;

(2) Eliminating irritating, protracted, and costly disputes and correspondence;

(3) Establishing a standard of practice which will be acceptable to and recognized by agencies, advertisers, and newspapers;

(4) Permitting agencies and advertisers to determine accurately the insertion cost of a newspaper campaign before it is undertaken.

The standard order blank made available by the American Association of Advertising Agencies and the National Association of Transportation Advertising, Inc, replaces a confused assortment and variety of contracts formerly used for car card advertising, *Printers' Ink* declares in its report of the new standard. Although the order blank is similar to those now used for publications and spot radio, it marks the first time that such a contract has been used for car card advertising.

Robert B. Shepard

The valuable contributions made to the work of the American Standards Association by Robert B. Shepard, recently deceased chief electrical engineer of the Underwriters Laboratories, Inc, were given special recognition by the Standards Council in a resolution adopted at its September meeting.

Mr Shepard had long been associated with the American Standards Association through its participation in the work of the Electrical Standards Committee, the Board of Examination, and the Standards Council, as well as through his membership on numerous sectional committees concerned with standardization in the field of electrical engineering.

He had served as an alternate representative of the Fire Protection Group on the ASA Standards Council for the past 13 years. Also as an alternate representative for the Fire Protection Group, Mr Shepard was first appointed to the Electrical Standards Committee in 1931. He continued in this capacity until 1945 when he became a full member, which position he held until his recent passing.

The resolution adopted by the Standards Council reads:

"WHEREAS, The Council of the American Standards Association has learned with deep regret of the passing on June 20, 1946, of our associate, Mr Robert B. Shepard;

"*Resolved*, That in the death of Robert Blanchard Shepard, Chief Electrical Engineer of the Underwriters Laboratories, Inc, New York City, the American Standards Association has sustained a distinct loss.

"Mr Shepard has served constructively since the early days of the Association as representative of the Fire Protection Group on the many ASA Sectional Committees on electrical standardization and as representative on the Standards Council.

"During the war, in Washington, Mr Shepard made valuable contributions to the success of the work on war projects with which the American Standards Association was concerned.

"*Resolved*, That this resolution be spread on the minutes of this meeting and that copies be sent to the Underwriters Laboratories, Inc, and to Mr Shepard's family."

New Tests For Tool Life

By O. W. Boston

A thoroughgoing presentation of the recently approved American Standard by means of which comparative results can be obtained on tests to determine the work life of a tool

O. W. Boston, *chairman of Technical Committee 21 of ASA Sectional Committee B5, Standards for Small Tools and Machine Tool Elements, is Professor of Metal Processing and chairman of the Department of Metal Processing at the University of Michigan.*

WHEN is a tool dull? Which of several types of tools are superior? What is meant by machinability? These are questions on which there are many different opinions. The American Standard on Life Tests of Single-Point Tools Made of Materials Other Than Sintered Carbides is an attempt to provide an answer to these questions and to outline specifically a method for evaluating single-point cutting tools for use on such machine tools as lathes, turret lathes, boring mills, planers, and shapers. Because carbide tools fail or wear somewhat differently from those of steel and cast nonferrous alloys, a separate procedure for rating them is being developed.

By "machinability" is meant the ability of a metal to be machined satisfactorily or the ability of a cutting tool to perform satisfactorily, or even the ability of a cutting fluid to facilitate the cutting operation. Good machinability implies satisfactory results in machining. It is manifest by any one or a combination of several results as follows:

(*a*) Long tool life or high productive capacity
(*b*) Good surface quality of the machined surface
(*c*) Well broken-up chips which are easily disposed of
(*d*) Low power consumption in removing a given quantity of material
(*e*) Uniformity in dimensional accuracy of successive parts

The performance of a cutting tool is definitely associated with the material being cut and the cutting fluid being applied. Its performance is a function of its material, its shape, and size. Machinability is not a basic standard but is relative. The rated machinability of two or more tools may vary for different processes of cutting, such as heavy turning, light turning, or forming (as well as for other processes).

The purpose of the new American Standard is to present a means by which the wear on a tool can be used to determine its life between grinds so that different agencies can evaluate various tools and have their results comparable. The standard has been prepared to provide a wide range of testing conditions to meet as nearly as possible the actual cutting conditions required of the tools.

Variable Factors. Certain variable factors involved in each test:

(*a*) The machine tool—its type, size, condition
(*b*) The material cut—its analysis, structure, hardness, strength, size, and rigidity
(*c*) The tools—the material, treatment, and shape
(*d*) The cutting fluid—class, properties, method of manufacture, and application
(*e*) The size of cut (depth of cut and feed) and its shape

Each of these variable factors is discussed below to indicate what information is needed in order to compare the test data with data obtained elsewhere.

Single-Point Tools. Single-point tools may be of a solid, bit, or tipped type. Solid tools, Fig. 1, are those in which the point of the tool is of the full shank section and consists entirely of metal-cutting material. Tipped tools are those in which a relatively small piece of metal-cutting material is attached to the tool point to form the cutting edges and face. Bit tools have relatively small pieces of tool material (or small tool shank material tipped with cutting tool material) clamped to a shank or tool holder, Fig. 2.

In compiling the test data, the cutting tools shall be specified as solid or tipped. If tipped, the method of attachment and the material of the shank should be given. All materials are to be described fully. The supporting surface quality and area, the fit of tool to holder, and method of clamping shall be described. The clamping method, whether single-point bearing or a setscrew on a pad, shall be specified. The amount of overhang should be limited to the width of the tool bit.

The shape of the tool point shall be specified. Tool angles and data such as back rake, side rake, end relief, side relief, end-cutting-edge angle, side-cutting-edge angle, nose radius, setting angle, chip-breaker groove or shelf, grinding wheel used, and type of machine, together with lapping or honing practice, should be given in detail. It is suggested that the tool point nose have a $\frac{1}{32}$ in. flat at a 45-deg chamfer, a radius of at least $\frac{1}{32}$ in., or a sharp point. In any event, the radius should be measured and recorded as this is an important factor influencing tool life. The cutting edge should be placed on the center line of the work.

A convenient key as to tool shape of the bit type shown in Fig. 2 is as follows: 8, 22, 6, 6, 6, 15, $\frac{3}{64}$. This means that the tool has 8-deg back rake, 22-deg side rake, 6-deg end relief, 6-deg side relief, 6-deg end-

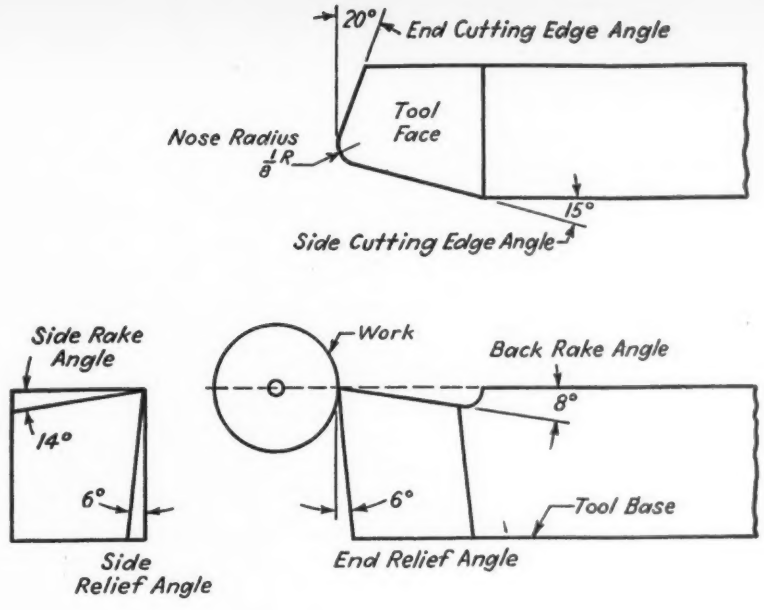


Fig. 1. Typical Solid Tool of High-Speed Steel Ground for Heavy Turning Steel of About 250 to 300 Brinell

cutting-edge angle, 15-deg side-cutting-edge angle, and $\frac{3}{64}$-in. nose radius.

The setting angle is 90 deg when the axis of the tool shank is at right angles to the axis of the work. The tool holder angle should be specified.

The nomenclature of a solid-type tool for heavy cuts is shown in Fig. 1.

Machine Tool. Under "machine tool" should be listed information as to:

(*a*) Type
  (1) Engine lathe, turret lathe, etc
  (2) Manufacturer, model, and age

(*b*) Condition—type of bearings for spindle mounting, runout, and state of repair

(*c*) Capacity or size—swing over the ways, distance between centers, bar-stock size, maximum length to be turned

(*d*) Method of power transmission—belt drive to step-cone pulley, belt drive to constant-speed pulley, geared head, direct motor drive, etc; size and type of motor

(*e*) Speeds available—in spindle revolutions per minute

(*f*) Feeds available—in inches per revolution

(*g*) Tool mounting and work-holding means—types of support, method of holding the tool and setting its nose on center

Material Cut. For the material cut, information should be given as to:

(1) AISI, SAE, WD, NE, etc, types or chemical analysis and an indication of whether the workpiece is a laboratory specimen or a production part

(2) Thermal treatment (normalized, annealed, quenched, and tempered)

(3) Scale or surface condition
  As-forged, as-cast, or as-rolled (cleaned, pickled, blasted, hot-rolled, or cold-drawn)

(4) Physical condition
  Grain size and structure—microstructure

(5) Physical properties
  Tensile strength
  Yield point
  Impact
  Hardness
  Reduction of area
  Elongation
  Work-hardening capacity

(6) Shape and rigidity, continuous or intermittent cutting

If test logs are used instead of commercial work, then the size of the test piece must be adequate to assure rigidity and avoid chatter.

Size of Cut. It is known that tools compared when taking light cuts are not necessarily arranged in the same order of merit as when taking heavy cuts. These cutting con-

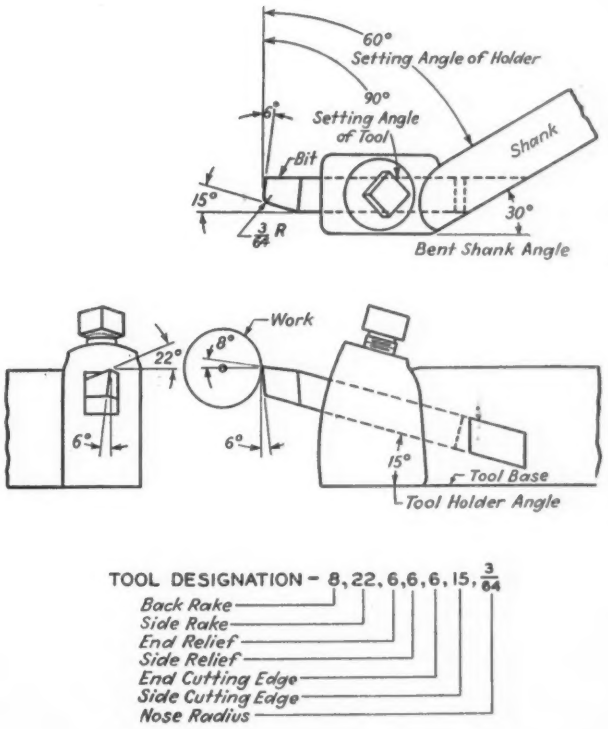
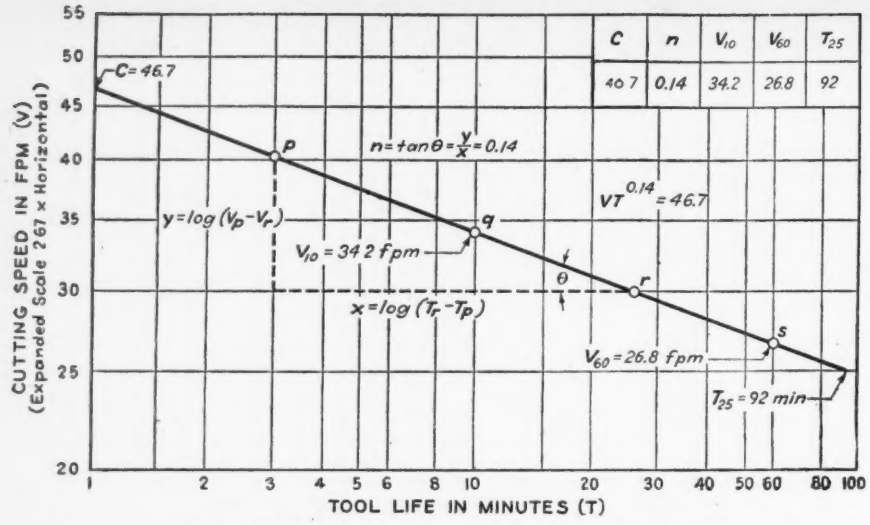


Fig. 2. Typical Tool Holder With 30 Deg Left-Bent Shank and 15 Deg Tool Holder Angle. A Right-Cut Tool Bit 3/8 In. Square of High-Speed Steel for Turning Soft Steel Is Shown



(Cuts in annealed SAE 2340 steel were dry at 0.200 in. depth and 0.050 in. feed with high-speed-steel tools of the 8, 22, 6, 6, 6, 15, 3/64 shape. The log-log scale has a vertical scale 2.67 times the horizontal.)

Fig. 3. The Cutting-Speed Tool-Life Line for Turning With Single-Point Tools, as Determined from Experimental Tests as at *p*, *q*, *r*, and *s*

ditions must be varied then as follows:

(*a*) Light, intermediate, or heavy cuts on materials which give discontinuous chips such as cast iron

(*b*) Light, intermediate, or heavy cuts on materials which give continuous chips such as steel

(*c*) Size and shape of cuts, tools, and cutting fluids, and materials for general purpose work

(*d*) Cuts, tool materials, cutting fluids, and materials for a specific commercial job

Depths of cut and feed in inches per revolution suggested for light, intermediate, and heavy cuts are:

(1) Light cuts, 0.010-in. depth by 0.002-in. feed.

(2) Medium light cuts, 0.100-in. depth by 0.0125-in. feed.

(3) Medium light cuts, 1/8-in. depth by 0.020-in. feed.

(4) Medium light cuts, 3/16-in. depth by 0.010-in. feed.

(5) Heavy cuts, 1/4-in. depth by 0.03-in. to 0.05-in. feed.

Method of Test for Cutting-Speed Tool-Life Relationship

In a test to evaluate tools, materials, or cutting fluids based on the relation between cutting speed and tool life, there should be but one variable, namely, the material, the tools, or the cutting fluid. If it is the tool material that is under consideration, then the material cut and the cutting fluid should be kept constant, together with the shape of the tool and the size and shape of cut. For each class of material machined there is naturally a tool form best suited for the purpose.

For the tool material tests, for example, the following should be kept constant:

(1) Tool shape
(2) Depth of cut and feed in inches
(3) Setting angle of the tool
(4) Analysis and heat-treatment of the material being machined
(5) Type of cutting fluid used; dry cutting is included as a cutting fluid

There must be a number of specific tests outlined, so that that particular test which most nearly reproduces the commercial conditions under which the tools are to be used may be selected.

The cutting speed shall be measured on the uncut work surface ahead of the tool. It should be recorded in feet per minute.

There are two general methods now in common use for obtaining machinability ratings based on tool life:

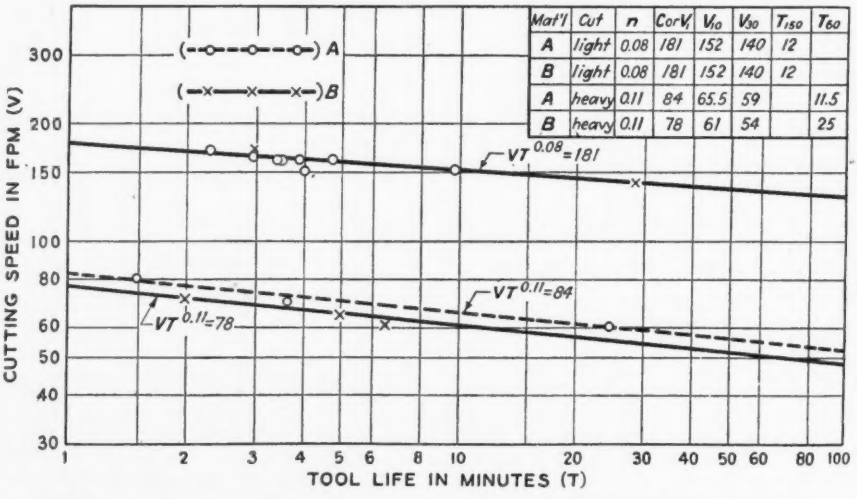
(1) To obtain the tool life when cutting under standardized conditions at a constant cutting speed, as in turning cylindrical test bars.

(2) To obtain the tool life when cutting at a uniformly increasing cutting speed, as in facing.

In the facing tests, the cutting speed usually increases uniformly as the cut proceeds from the center of the work. The tool usually fails by virtue of very high temperatures caused by the constantly increasing speed. There is yet no satisfactory relationship between the tests based on facing with increasing speed and those in turning with uniform speed.

How to Find Tool Life in Facing Tests Based on Increasing Speed

For the first type, the tool life for total failure for each of four to eight tools of a type or shape shall be obtained for several different cutting speeds, in accordance with the following procedure: The formula expressing the relation between cutting speed and tool life between grindings for a given tool, material,



(Both steels were quenched and tempered to give a Brinell hardness of 363. The tools of high-speed steel are described in the text. Two cuts were made dry—a light one with a feed of 0.0127 in. and a depth of cut of 0.0125 in., and a heavy one with a feed of 0.0127 in. and a depth of cut of 0.100 in.)

Fig. 4. Tool-Life Cutting-Speed Relationship in Turning Two Forging-Die Steels Known as A and B

cutting fluid, feed, and depth of cut is

$$VT^n = C$$

where V = the cutting speed in feet per minute
T = the tool life or duration of cut between grindings in minutes
C = a constant depending on the specific conditions, and equals the cutting speed for a tool life of 1 minute
n = the slope of the straight line on log-log paper.

If four or more turning tests were run on a metal in which all factors were kept constant except the cutting speed V, a definite value of tool life at failure T would be obtained at each cutting speed, as indicated by points p, q, r, and s on the curve in Fig. 3. These and more points plotted on Cartesian coordinates would indicate a hyperbolic curve. On log-log paper they produce a straight line.[1]

In Fig. 3 y as scaled should be divided by 2.67, as in this case the vertical ordinate scale is 2.67 times the horizontal to exaggerate the slope. When $T = 1$, then $C = V_1$ (46.7 feet per minute for a one-minute tool life). V_{10} (the cutting speed in feet per minute for a ten-minute tool life) as read from the curve is 34.2, V_{60} is 26.8, whereas T_{25}, the tool life for the cutting speed of 25 feet per minute, is 92 minutes. These values, or similar ones needed to compare this curve with another, are summarized in Fig. 3.

[1] The equation of a straight line on Cartesian co-ordinates is

$$y = ns + b,$$

but on log-log paper it is

$$\log y = n \log x + \log b$$

(or $\log V = n \log T + \log C$). The slope of the line n is negative and equals y/x; then $V = T^{-n}C$, or $VT^n = C$.

What Is Meant by Tool Failure

Single-point tools in continuous cutting may fail by

(*a*) Abrasion or wear on the flank below the cutting edge
(*b*) Wearing a cup in the tool face back of the cutting edge which becomes steadily larger and finally causes the cutting edge to crumble
(*c*) Combined flank and face wear

Sometimes before the complete breakdown of the tool or ultimate failure, there is what is called a preliminary failure. By *preliminary failure* is meant the failure of a small portion of the cutting edge. This may occur on the end of the tool, such as on the nose radius, and change the quality of the machined surface. To avoid preliminary failure, either the nose radius may be reduced, the side cutting edge angle increased, or the shape of cut changed. In this way it is possible to prevent the failure from changing the quality of the machined surface and have it affect finish only on the shoulder left by the chip removal. Preliminary failure is evident by the appearance on this shoulder of a narrow, highly-burnished band. If the cut is continued, the band will keep changing, usually getting larger until the time of complete tool failure when the shoulder is completely burnished and the intersection of the shoulder with the cylindrical machined surface is joined by a fillet of suddenly increasing radius. This *complete failure* occurs in a fraction of a second.

Preliminary failure may occur after the tool has been cutting for a part of its total life. It may occur after 50 percent or 75 percent or even 95 percent of its total tool life, depending upon the particular tool material, tool shape, size of cut, etc. If the time of preliminary failure is recorded along with that for total failure and the points plotted on log-log paper similar to those of total failure in Fig. 4, a second line will be obtained somewhat lower for the preliminary failure points than for the final failure points, which may be parallel to the ultimate failure line or making a small angle with it, showing either increased or less slope. For some tests this line, based

Table 1. Suggested Data Sheet for Cutting-Speed Tool-Life Tests in Turning
(These data are plotted in Fig. 4 to form the two highest lines)

Tools: ⅜ in. square × 3 in. long, high-speed steel (RCS)
Material cut: Die steels A and B forged log 6 in. diameter × 20 in. long, 363 Brinell
Depth of cut: 0.0125 in.
Feed: 0.0127 in. per revolution
Date: 6/4/38
Tool angles:
Back rake angle, deg. 8
Side rake angle, deg. 14
End relief angle, deg. 6
Side relief angle, deg. 6
End cutting edge angle, deg. 6
Side cutting edge angle, ... 15
Nose radius ..... 3/64 in.
Setting angle ..... 90 deg
Back slope of bit in holder ..... 10½ deg
Observer's name: .....
Tool support: Special solid tool holder 1½ inches × 2½ inches × 4 inches
Cutting fluid: Dry
Room temperature: 75 F

Test Number	Tool Number and Rockwell C*	Work Diameter at Cut	Log Sect†	Cutting Speed, fpm	Tool Life, in Min	Cutting Fluid, Temperature	Remarks: Nature of Tool Failure and Types of Chips	
5	44T-64	5.650	4	164.8	2.94		Typical cup failure	Die Steel A
6	67T-64	5.650	3, 2	163.8	3.90		Typical cup failure	
57	80B-63.5	5.275	3	161.6	4.77		Typical cup failure	
59	45B-64	5.225	3	151.5	9.87		Typical cup failure	
34	78B-64	5.030	4, 3, 2	161.6	4.08		Typical cup failure	Die Steel B
35	75T-64	5.03-5.000	4, 3, 2	141.4	28.27		Typical cup failure	
37	64T-64	4.905	4, 3, 2, 4	151.5	10.16		Typical cup failure	

* Tools ground on both ends, one end T, other B.
† 20-in. log divided into four sections of 5 in. each, numbered 1 to 4 from chuck.

on preliminary-failure life, may be used in evaluating tools, materials, or cutting fluids.

For a given set of test conditions, preliminary failure may be found to give ratings closer to the practical results than final failure. This may be true, particularly in screw machine work where the shape of the work controls the shape of the tool as, for example, where a sharp shoulder is desired, or in finishing cuts where uniform surface quality is important.

When a tool fails by abrasion on the flank below the cutting edge, it is usually difficult to observe progressive wear. Its presence is noted on the surface quality or on the shoulder. However, if flank wear occurs on the tool end, the diameter of the work will be increased in proportion and the surface finish will appear more burnished. If it occurs on the shoulder, the surface quality of the shoulder will become more burnished as the tool cuts with zero relief. This condition continues until sufficient heat is generated to cause the tool to fail suddenly.

In applying the data obtained from preliminary or final failures to practical shop work, a tool life should be selected somewhat less than that at which preliminary failure occurs so that the tools may be removed from the machine and reground by touching up. This removes less tool material than by regrinding after total failure. These practical cutting times should, however, be based on the time of preliminary or total failure.

During the machining of abrasive, short-chip materials, such as cast iron, which cause the tools to fail by flank abrasion, tool life based on a specified amount of flank wear, such as 0.020 inches, may be used as a method of determining tool failure and of deciding when the tool should be reground.

A Typical Test

In Fig. 4 are shown the results of cutting-speed tool-life tests on two die steels, both heat-treated and tempered to give a Brinell hardness of 363. The material was furnished as forgings 6 in. in diameter and 20 in. long. Two different sizes of cut were used when turning dry. One cut was a finishing cut of 0.0125-in. depth and 0.0127-in. feed. The second was a heavier cut of 0.100-in. depth and 0.0127-in. feed. High-speed-steel tools of 18-4-1 type (known as Red Cut Superior) were used. These tool bits were held in a solid steel tool holder 1½ in. wide, 2½ in. deep, and 4 in. long by one set screw on the top. The tool-holder angle was 10½ deg and the setting angle was 90 deg. The tool point was ground to have working angles of 8, 14, 6, 6, 6, 15, 3/64. The tool bits were ⅜ in. square.

A sample data sheet is shown as Table 1. The values of cutting-speed tool-life are shown plotted in Fig. 4. The comparative results are shown as a table in Fig. 4. For the light cut, both steels give the same data, i.e., the same slope n of 0.08 and the same value of C of 181. This means that both lines have the same slope and pass through the same point, therefore the machinability based on cutting-speed tool-life under these conditions is identical and values of V_{10}, V_{30}, and T_{150} are equal. For the heavy cut, the slope as represented by n is 0.11, indicating these lines to be steeper than those for the light cuts. This is disadvantageous. The value of C for steel A is 84, while that for B is only 78 feet per minute. The former is 6 feet per minute or 7.7 percent higher. V_{10} for A is 65.5 and for B is 61. The former is 4.5 feet per minute, or 7.4 percent higher.

For the light cut, the value of T_{150} is 12 for both steels. For the heavy cut T_{60} is 11.5 minutes for steel A and 25 minutes for B. The latter is 117 percent greater.

These results show that the two steels machine equally well, and favorably with the low slope, at light cuts, but that steel A machines better than B at the heavy cuts.

In this same manner, keeping the cutting fluid and material constant, the cutting tools of different shape or material may be evaluated.

Twenty-two American Standards on Small Tools and Machine Tool Elements have already been completed under Project B5 organized under the procedure of the American Standards Association and sponsored by the American Society of Mechanical Engineers, the National Machine Tool Builders' Association, the Society of Automotive Engineers, and the Metal Cutting Tool Institute. The new American Standard for Life Tests of Single-Point Tools Made of Materials Other Than Sintered Carbides, B5.19-1946, is one of these 22 standards. Chairman of the B5 sectional committee is W. C. Mueller, Manufacturing Engineer, Western Electric Company, representing the American Society of Mechanical Engineers and the ASA Telephone Group. Frank O. Hoagland, Pratt & Whitney Division, Niles-Bement-Pond Company, who represents the National Machine Tool Builders' Association, is vice chairman; and P. L. Houser, Manufacturing Research Department, International Harvester Company, is secretary.

The members of the technical committee that developed the American Standard on Tool Life Tests are:

O. W. Boston, Professor of Metal Processing, and Chairman, Department of Metal Processing, University of Michigan, *Chairman*
E. E. Griffiths, Director, Headquarters Manufacturing Engineering Department, Westinghouse Electric Corporation
E. J. Hergenroether, International Nickel Company
P. L. Houser, Manufacturing Research Department, International Harvester Company
M. F. Judkins, Chief Engineer, Firthite Division, Firth-Sterling Steel Company
F. W. Lucht, Development Engineer, The Carboloy Company, Inc
H. L. Moir, Technical Adviser to Marketing Department, The Pure Oil Company
G. W. Metz, Section Engineer, Headquarters Manufacturing Engineering Department, Westinghouse Electric Corporation
H. J. Vandestadt, Manufacturing General Department, General Electric Company
G. P. Witteman, Assistant Metallurgical Engineer, Bethlehem Steel Company

Copies of American Standard B5.19-1946 can be obtained from the American Standards Association at 45 cents each.

RMA Standards for Radios Aid Buyers and Producers

ENGINEERING standards designed to improve the performance of radio and television receivers and phonograph record players and to simplify their manufacture and servicing have been adopted by the General Standards Committee of the Engineering Department, Radio Manufacturers Association, and are being incorporated in a revision of the RMA manual. This revision will be the first since before the war.

RMA engineering standards are the result of months of study by RMA Committees. Their use by manufacturers is strictly voluntary.

New Standards Adopted By Radio Manufacturers

Among the new standards adopted by the RMA Engineering Department and soon to be published are the following:

Color code for radio chassis wiring (S.P. 162): While radio set manufacturers have had their own color codes for wiring radio chassis for some time, this RMA standard is expected to make these codes uniform and thus greatly facilitate the job of servicing radio sets. It also will minimize the variety of chassis wiring materials used in the assembly of radio sets. Use of color codes permits the wiring of this complicated electrical device by persons of minor skills who may have no technical knowledge.

Intermediate frequency of 10.7 mc for VHF broadcast receivers (S.P. 163): By standardization on the value for the frequency at which the intermediate frequency amplifier of FM receivers operates, production of IF transformers will be simplified and the variety of testing and adjusting equipment and skills required in production and servicing of FM receivers will be minimized.

As similar standardization for AM receivers in the early days of radio did much to minimize interference, it is expected that this RMA standard will affect the frequency allocation practices of the Federal Communications Commission and other frequency-assigning bodies so as to minimize the interference to which broadcast receivers incorporating the standard IF are likely to be subjected.

Antenna-to-set transmission line for television receivers (S.P. 164) *of 300 ohm characteristic impedance and comprised of parallel unshielded pair.* Without this standardization, television set makers would be generally required to supply lines, antennas, and attendant parts to assure proper installation and operation of their television receivers. By adopting this standard, RMA paves the way for increasing specialization in antenna and line design production, installation, and servicing with resulting efficiency and economy.

The RMA Engineering Department, for similar reasons, also has standardized the IF for sound channel of television receivers between 21.25 and 21.9 mc with oscillator at frequency higher than signal (S.P. 165).

Chassis pickup in automobile receivers (S.P. 167): This standard serves to define and outline measurement details whereby proper operation of auto receivers may be assured. By this standard the purchaser of auto receivers gains additional protection and the designer and producer, as well as the installer, are afforded a simple, useful yardstick for checking the receiver's operation.

Dimensional characteristics of phonograph records (S.P. 169): This standard is designed to assure the workability of record players and automatic record changers despite the currently large variety of types of equipment. Limitations on the dimensions of records are set forth in detail.

Dimensional characteristics of drive pulleys (S.P. 170): This standard is intended to reduce the number of drive pulleys used in connection with variable capacitors and other RF tuning devices on scales, dials, and the like. Adoption of this standard will minimize the variants required of pulley makers and simplify the stocks of set makers and service shops.

RMA also has adopted standard type designations for other than receiving and cathode ray tubes (S.P. 168).

The RMA Engineering Department has its headquarters at 90 West Street, New York, N. Y. Dr W.R.G. Baker, vice president of General Electric Company, is director and Virgil M. Graham, of Sylvania Electric Products, Inc, is associate director. L.C.F. Horle is chief engineer.

The Radio Manufacturers Association is a Member-Body of the American Standards Association.

NFPA Receives Award For Fire Prevention

A special Certificate of Merit has been awarded to the National Fire Protection Association for its success in bringing about the closest possible coordination with the War and Navy Departments in lessening loss of life and property by fire, and for its aid in making the public increasingly aware of fire protection and prevention. The award was presented by the American Trade Association Executives at their 27th Annual Convention.

Judges for the ATAE award were: Secretary of Commerce W. A. Harriman; W. L. Chenery, publisher of Colliers Weekly; Eric Johnston, representing the Chamber of Commerce of the United States (its past president); Ira Mosher, representing the National Association of Manufacturers (its past president); and Franklin B. Snyder, president of Northwestern University.

The NFPA, which has members in 41 countries throughout the world, is celebrating its 50th anniversary this year.

Index to Volume 17, 1946

A complete index to Volume 17 of INDUSTRIAL STANDARDIZATION (1946) will be published as Part 2 of the February, 1947, issue. Everyone receiving a copy of that issue will also receive a copy of the index.

ASTM Accepts New and Revised Materials Specifications

ON the recommendation of several of its technical committees the American Society for Testing Materials, through its Administrative Committee on Standards, on September 9 approved 33 new and revised specifications and tests. There are new tentative specifications or tests covering Magnesium-Base Alloy Extruded Round Tubing (B 217); Facing Brick (Solid Masonry Unit Made from Clay or Shale) (C 211); Calorific Value of Gaseous Fuels by the Water Flow Calorimeter (D 900); Test for Water-Vapor Permeability of Packages (D 895); Resistance of Adhesive Bonds to Chemical Reagents (D 896); and Tensile Properties of Adhesives (D 897). A revision in the Standard Specifications for Building Brick Made from Clay or Shale (C 62-44) makes it possible to use it in plans based on modular coordination of building materials and equipment.

Magnesium Extruded Tubing—

This new specification, B 217-46 T, covering a product in rather widespread commercial use virtually gives the Society complete coverage through its numerous specifications and tests of the various commercial wrought magnesium alloys and products. Four types of alloys are provided, three carrying aluminum ranging from 2.5 to 9.2 percent respectively, and the fourth being a manganese composition with a minimum of 1.20 manganese. The tensile requirements for the alloys carrying aluminum range from 34,000 to 38,000 psi while the other alloy has a minimum of 28,000 psi.

Compressive Strength of Mortars—

The revisions in the Method of Test for Compressive Strength of Hydraulic Cement Mortars, C 109-44, concern the determination of flow and the molding of the test specimens. In general they effect a saving in the operator's time and in the amount of standard sand required. These revisions are tentative and will be published for a year or more before adoption.

Masonry Building Units—

ASTM Committee C-15 on Manufactured Masonry Units, in addition to a new Tentative Specification for Facing Brick (C 211-46 T), had developed numerous revisions in its other specifications and tests. The new Tentative meets the need for requirements for facing brick, as a result of the recent trend to differentiate clearly between common and facing brick. Two grades are covered, for use where there is frost action and disintegration by weathering or where there is no such deteriorating influence. The requirements cover comprehensive strength which for the two grades must not be less than 2500 and 3000 psi, respectively (average of 5 brick); and there are requirements on extent of chippage, appearance, size, and warpage, etc. The revisions in other standard specifications are set up for various reasons: in the Building Brick Specification C 62-44, to make it conform to modular planning; in the Structural Clay Non-Load Tile C 56-41, marking requirements are established; these also apply in the case of C 57-39.

The new Tentative Definitions of Terms (C 43-46 T) involves numerous changes and additions. The older definitions were obsolete in some respects and new terms had come into usage. The definitions cover various raw materials, tile, surface features, and such matters.

Paint and Related Materials—

The change in Method of Preparing Steel Panels (D 609-46 T) is intended to improve the surface of the panel and therefore the whole testing procedure. The changes in other tests in general bring the methods up to date and in the case of the Specifications for Zinc Chromate D 478-41, new requirements for additional pigments have been incorporated.

Calorific Value of Gaseous Fuels—

This new method is the first of a series of testing procedures which will result from research work extending over several years, carried out under the auspices of ASTM Committee D-3 on Gaseous Fuels. The Committee has sponsored a great deal of cooperative research at the National Bureau of Standards and in numerous other laboratories involving methods for determmining specific gravity and density, water vapor content, the complete analysis or chemical composition of fuels, the collection of samples, and calorific value. Some of this work has involved the design of new equipment, and a large number of samples of fuels have been distributed for round-robin tests in the corporating members' laboratories to evaluate the proposed procedures which were developed.

The new tentative methods of test for calorific value (D 900-46 T) comprise an extensive document covering definition of the terms, the standardization of which in itself was an important achievement, testing procedures which involve adjustments for humidity correction and control, and finally the calculation of the calorific value. This section gives discussion of the theory of the method of calculation as well as procedures for arriving at the *total* and *net* calorific values.

Water-Vapor Permeability of Shipping Containers—

After considering various proposed methods and after reviewing the results reported by various members of the group concerned, Committee D-10 on Shipping Containers recommended the new Tentative Test D 895-46 T. This applies to finished containers when they are closed and sealed in the conventional manner. Water-vapor permeability for this particular test is defined as the rate that water is transmitted into the container

from the test atmosphere of 90 ± 2 percent relative humidity and 100 ± 3 F surrounding it while a desiccant is sealed within.

Rubber and Rubber Products—

The change in the Tentative Requirements for Rubber Sheath Compound (D 532-46 T) eliminates vulcanizing in a metal mold, which test is considered superfluous, providing the physical requirements are met. The Ozone-Resistant Type Wire Insulation D 574-46 T will have the value of the constant *K* in the formula for insulation resistance changed from 5280 to 2000. During the war, this constant was dropped to 1000 in the emergency alternate provisions. In effect, therefore, this change increases the constant to 2000. This value is the same as now used in ASTM Tentatives D 754-46 T and D 755-46 T covering synthetic rubber insulations.

Revisions in the Heat-Resisting Synthetic Rubber Compound Tentative Specification D 754-46 T will permit the use of some natural rubber when this becomes available and will include additional types of conductors with the 1/32 in. wall. In another tentative specification for insulated wire and cable, Performance Synthetic Compound (D 755-46 T), the use of natural rubber, and additional types of conductors, are included and, further, the aging requirements are made more rigorous. This is an improvement and one which the manufacturers can meet.

The Tentative Methods of Testing Rubber Insulated Wire and Cable (D 470-46 T) now include the horizontal flame test which had appeared during the war as an emergency revision. The change in the Tentative Method of Test for Rubber Hose (D 380-46 T) will permit the use of a certified test slab from the same material as used in the hose in cases where the material is so thin that the minimum requirement of 1/32 in. cannot be made available.

A new alternate method which is particularly applicable to fabrics having low resistance to passage of moisture has been incorporated in the various tests for rubber-coated fabrics as established in the Tentative Method of Testing Rubber-Coated Fabrics (D 751-46 T). This involves the Suter equipment. The adhesion test procedure is being modified so that the results should give a better average figure instead of the maximum values.

Standard Oil Co (N. J.) Photo by Eagle

Coating Synthetic Rubber on Fabric

Important changes in ASTM standards for rubber and rubber products bring the test methods up to date.

Of particular interest in identifying and analyzing synthetics is the incorporation in the Tentative Method of Identification and Quantitative Analysis of Synthetic Elastomers (D 833-46 T) of spot tests, representing utilization of the results of recent work. These tests are more rapid and considered fully as reliable as those replaced.

Testing Adhesives—

The new tentative methods of testing adhesives—the first, Tensile Properties of Adhesives, D 897-46 T; the other, Resistance of Adhesive Bonds to Chemical Reagents, D 896-46 T—are the first that have resulted from the relatively new Committee D-14 on Adhesives. There is intensive demand for test methods for evaluating different types of adhesives and possibly also for performance type specification but the committee has for the past year or two been concentrating its work on test methods.

The tensile test will determine comparative properties of adhesives, using a standard shape specimen with specific conditions of pre-treatment, temperature and testing speed. The requirements give specific dimensions on the test specimens and their quality whether wood or metal, the gluing and conditioning, the number of specimens (at least 10 must be tested) and the general procedure.

The new test for resistance of adhesive bonds to chemical reagents requires the use of the other new test for tensile properties, D 897-46 T. The testing procedure requires that each specimen shall be in a separate container, totally immersed in the reagent for 7 days at a temperature between 25 and 30 C, and the reagent is to be stirred every 24 hours. After rinsing with distilled water and drying, the specimen is tested immediately. Various standard chemicals are listed, including sulfuric acid of various strengths, sodium hydroxide solutions, various alcohols, and others.

Copies of all of the new and revised ASTM specifications will be available during the fall from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa., at 25¢ each. They are also being included in the new 1946 *Book of ASTM Standards* to be issued in December-February, in five parts.

News from other countries

Standards in France

By Eng. General Pierre Salmon

Commissioner of Standardization, Ministry of Industrial Production

FOR many years France has endeavored to standardize certain essential elements of her industry. A few standardizing bureaus, notably those dealing with electricity, had already been set up before 1914 and had even participated in international conferences. But it was out of the necessities of the World War, in 1917, that the need became apparent for a special organization in order to expand the war effort. It was this need that brought about the creation of the Permanent Commission for Standardization which, up to the end of the war in 1918, prepared the specifications necessary for the manufacture of articles for the armies.

The exigencies of peacetime economy brought about an extensive modification of the organization set up during the war; new standardizing bureaus were created in the different industries and it became indispensable to coordinate all these efforts. For this reason there was created in 1926 the Association Française de Normalisation (AFNOR), an organization charged with the coordination of all standardizing work in France, with the development of standards projects, and their presentation to the Government for official recognition. The organization thus set up continued to function up to the war of 1939. Until 1944 the German occupation prevented normal work, which would only have been of profit to the invader.

Immediately after the liberation the French Government, faced with the accumulated ruins of the war, decided to give a new impulse to standardization. AFNOR, a private organization, had to be more strongly and closely supported by the public authorities. The Commissariat for Standardization, of recent date, was invested with the powers necessary for this purpose. Thus was created the present organization, which is briefly described in the following.

The Commissioner of Standardization, in the name of the Government, determines the nature and the degree of urgency of the projects to be undertaken; he verifies their performance, and has official standards approved. Moreover, he sees to it that industry applies standards of public interest and takes all measures necessary to facilitate this application.

AFNOR looks after the distribution of standardizing work among the several branches of the economy, and ensures the proper drafting of standards projects. AFNOR also conducts all of the necessary conferences on the texts of standards, submits standards to the Commissioner of Standardization for approval, and arranges for their sale and distribution.

In each field of activity specialized bureaus of standardization prepare the technical contents of standards, in conformity with the prescribed program.

Accordingly—

The technical bureau prepares the substance of the standard;

AFNOR looks after the editing of the standard, makes the necessary investigations, and submits the definitive project to the Commissioner of Standardization;

The Commissioner of Standardization superintends the execution of the general program, secures the approval of standards and supervises their application.

It may be remarked that this organization and this procedure are characterized by two principal features.

Conferences and Investigations Important

The first is the importance given to investigations and conferences. First drawn up by a group of producers working in a bureau of standardization, the standard is then submitted to all the users of the product with which it deals. The former give their views on what may logically be required of products, the latter on what they expect of them, for it is the latter who will make proof of their quality and who will have to suffer from their defects. After this, the advice of the Government is sought, for it might be that the standard does not conform to the established policy; but this hypothesis is actually somewhat theoretical. The liaison of standardization with the Administration has, however, another happy result—to ensure perfect concordance between standards and legal and regulatory texts.

The second characteristic feature of the procedure followed is the fact that standards must always respect the principles which we have adopted as bases of the work, particularly with respect to units, numbers, tolerances, etc. The French system of legal units is respected with the greatest rigor in all standards. The principle of this well-known system is that for each kind of measurement there is but one unit with its decimal multiples, and that all the units of the various kinds of measurements

Translation by E. A. Pratt, Manager, International Relations, ASA.

are related to a small number of fundamental units. Its simplicity is very serviceable and permits considerable economies of time.

Whenever possible, standards are also related to the system of preferred numbers proposed by France and adopted internationally by the ISA, the principles of which are also to be found in American Standard Z17.1-1936, Preferred Numbers. This system is in accordance with the decimal system of numeration, as adopted throughout the world for writing numbers.

Finally, as we have already emphasized, the standards are closely related to the legislation of the country, which they follow with exactness, frequently making reference to it. On the other hand, it is not exceptional for the texts of laws or regulations to refer to standards in order to give more precision and realism to their provisions.

The Catalog of French Standards lists a total of more than 2,300 standards, while nearly 2,000 others are in more or less advanced stages. The groups of which we are particularly proud are, above all, those of the mechanical industries, particularly machine tools; also building construction, including household equipment; the automotive industry, already well advanced before this war; iron and steel, with respect to which a special effort has recently been made; and a number of others such as paper, aeronautics, maritime construction, welding, etc.

In each of these fields, standardization has been carried out under broad plans and on fundamental principles fully discussed in advance, so that the result would be of the best possible quality. Often considerable modifications of practices and tools have resulted, and application has not always been easy to obtain; in some cases it is not yet general. But since the principles are sound, one may be sure that sooner or later they will end by overcoming the resistance to standardization which is actually no more than a manifestation of habit.

Furthermore, to aid in the application of standards, in addition to the extensive propaganda conducted by AFNOR, we have undertaken and actively promoted the use of a national mark of conformity to standards, the presence of which on products guarantees that their quality conforms to that fixed in the standards. The mark enables the public to evaluate standardized products and attracts the attention of everyone to them.

The role played by standards as important technical documentation ought to be of foremost importance for postwar economic recovery and the reconstruction of the country.

Commonwealth Conference Studies Uniform Standards

UNIFORM rules throughout the British Commonwealth governing the marking of goods to indicate conformity to a national standard was one of the important questions discussed at the British Commonwealth Conference on Standards which opened in London September 30. The conference was attended by representatives of national standardizing bodies of the Commonwealth nations, including Australia, Canada, India, New Zealand, Palestine, and South Africa, as well as the United Kingdom. The Acts governing the use of certification and standards marks in the various countries were studied. The delegates agreed to recommend to their respective governments that action be taken to provide for effective protection and use of such marks and, so far as practicable, to secure that the laws concerning them should be uniform in each of the countries forming the British Commonwealth.

The methods which the Commonwealth standards bodies have been following for securing the maximum degree of coordination in their standards were reviewed and plans were made for extending this cooperation. In a number of cases, the Commonwealth associations hope to secure the participation of the American Standards Association, since the United States and the Commonwealth countries have the English language in common, according to reports from London.

Plans for the Commonwealth conference were started as long ago as 1938. In that year Percy Good, director of the British Standards Institution, visited Australia, New Zealand, and Canada, and discussed the question of marking goods to indicate conformity to a national standard with those concerned with industrial standardization in each of these countries. A great deal of interest was shown, and it was decided to have a joint conference early in 1940.

British View on Certification Discussed with Americans

On his way back to the United Kingdom, Mr Good paid a visit to the United States, and met with Dr P. G. Agnew (now vice president and secretary of the American Standards Association) and Dr Lyman Briggs, (then director of the National Bureau of Standards). As a result of their discussions, a meeting was held in Washington (presided over by Dr Briggs) attended by representatives of the National Bureau of Standards; the Federal Trade Commission; the American Standards Association; the American Society for Testing Materials; the American Retail Federation; the National Retail Dry Goods Association; and the National Consumer-Retailer Council.

Mr Good told those present that it is the opinion in the United Kingdom that marks indicating conformity to a national standard should only be permitted if the standard is a published standard and if adequate control is exercised.

This view is also held in the United States where a proposed American Standard on Certification Procedures establishing this principle is now being completed under the procedure of the American Standards Association.

The conference of Commonwealth standardizing bodies which had been planned for early in 1940 had to be postponed because of the war. At the end of the war plans were again made to hold the conference, this time early in 1946. This was changed, however, and the conference was actually held in late September and early October in order that the delegates from Australia, New Zealand, and India could also attend the meeting that set up the new international standards organization.

Advertising Groups Propose Standard Publication Sizes

STANDARDIZATION of page sizes and type areas in trade and technical journals has been the subject of discussion recently both in Great Britain and in the United States. In Great Britain a committee of the Institute of Incorporated Practitioners in Advertising has recommended that type areas be limited to three accepted sizes; in the United States the National Industrial Advertisers Association is recommending one standard size to its members. Because of paper limitations, the NIAA recommendation, just being made, is for a smaller size than the 8¾ x 11⅝ in. trim size standard recommended before the war. This will be effective, the Association explains, until paper shortages have been relieved. The new NIAA standard trim size is 8¼ x 11¼ in.; bleed page size 8⅜ x 11½ in.; and type page size 7 x 10 in. NIAA is advising all business papers listed in Standard Rate and Data Service of these new standards and requesting that they adopt them in their publications.

In Great Britain, the Institute of Incorporated Practitioners in Advertising finds that the most popular size of the type area in British publications at present is 7 x 10 in., the same as the new NIAA recommendation. Lest the adoption of one size prove to be too arbitrary, however, two other sizes, scaled proportionately, have been recommended by the Institute. These are: 8 x 11½ in., and 6¼ x 9 in.

The British have found that other countries have greater standardization of type areas, and that advertisers benefit from this standardization because they have to make only small adaptations in order to use the same advertisements in different periodicals. Of 638 British trade and technical publications studied by the committee, the maximum number with any one type area was 47, while there were actually 242 different sizes.

"Pocket size" publications, an outgrowth of scaling down page sizes during the war, were regarded as inadequate for display effect and unsuitable for the illustration of plant and machinery. In distribution abroad, it was pointed out by the committee's report, the "pocket size" periodical "would give a comparatively insignificant effect alongside American and other foreign periodicals."

Because of progress in other countries, especially America, in this field of standardization, the committee finds that ". . . many British trade and technical periodicals suffer by comparison as representatives of British industry in the export market. Thus national considerations, no less than the interests of publishers and advertisers alike, justify a careful examination of the facts with a view to possible remedy. . . .

"The great point is that this lack of uniformity must seriously hinder the general adoption of the highest standards in technical and trade advertisement production and appeal—thus placing British manufacturers at a real competitive disadvantage."

India Starts Study of Soil Tests

THE permanent committee set up by the Indian Central Board of Irrigation held its first meeting recently to review the standardization of methods and apparatus used in the testing and classification of soils.

It is the committee's task to define the tests necessary for the study of soils to meet the varying requirements of the engineer, to evolve standard methods for the various classes of tests, and to devise standard equipment for carrying out these tests. Relevant standards of other countries will be modified and adapted to meet India's special needs. In cases where the knowledge available is not sufficient to set final standards, the committee members have been urged to approve interim standards which can be modified as experience is gained with their use.

Rai Bahadur A. N. Khosla, president of the Board, in inaugurating the proceedings of the committee, divided the engineering study of the soil into six broad classes: Foundations and retaining walls, both for dry and saturated conditions; earth dams and embankments; road and airfield construction; low cost roads; subsoil flow in connection with hydraulic structures; and extraction of ground waters from the soil by tubewells and other means.

Also within the committee's scope is consideration of the problem of nomenclature used in connection with soils. A scientific nomenclature must be evolved to replace terms which have different meanings in different sections, or only a limited and local application, generally with no scientific basis or exact definition. This diversity of terminology makes it difficult for experience gained in one part of the country to be used in the study of similar problems in other portions of the country.

The committee began its work by defining its tasks, listing the different tests for soil, and examining the methods adopted in the United States. The necessary tests required for road and airfield subgrade, low cost roads, embankments and other canal works, dams and foundation studies were tabulated. Preliminary drafts of standard tests are to be prepared for consideration at the next meeting of the Board of Irrigation.

Standard Drawings for Chemical Apparatus

Designs are being revised and detailed drawings of general chemical apparatus in common demand are now being provided by the technical committee of the British Laboratory Ware Association, Ltd, for the use of its members. There has been no accepted standard in the past.

Thus far, drawings of the following have been completed: various types of condensers; drying tubes; potash bulbs; and Orsat gas analysis apparatus. It is hoped that the new designs will soon be incorporated in revised and new specifications issued by the Association's members.

New Standards from Other Countries

The following new and revised standards, recently received by the American Standards Association from other countries, may be borrowed by ASA Members from the ASA Library or purchased through the Sales Department.

Drafts of proposed standards are not for sale, but they may be borrowed.

Australia

Drafts of Proposed Standards

Electric Portable Lamp Standards and Brackets, Doc 51
Hinges for Residences, A55
Identification of Pipes, Conduits, Ducts and Cables in Buildings, Structures and Premises, CA21

Canada

Welding of Bridges, Buildings and Machinery (Metallic Electric-Arc Process) (Second Edition), W59-1946, 50¢

Great Britain

Drafts of Proposed Standards

Copper Tubes Which Are to Be Buried Underground, CH(NFE)6513
Electric Study and Reading Table Lamp, Draft Revision to BS710/1936, CH (LGE)6327
Geography Room Furniture for Use in Schools, CH(BS/MOE)5560
Hose Connections for Welding and Cutting Appliances, CH(WEE)6446
Low-Voltage and Medium-Voltage Electric Fuses, Revision of BS88:1939, CH(EL) 5096
Low-Voltage Cartridge-Fuses for Alternating-Current Electrical Circuits, CH(EL) 5094
Medical Room Equipment for Use in Schools, CH(BS/MOE)5562
Paper Towelling, Dispensing Cabinets and Disposal Bins, CH(PAC)6514
Photoelectric Exposure Meters, CH(PHC) 6499
Sizes of Photographic Paper for General Use, CH(PHC)6615
250-Volt Cartridge Fuse-Links, CH(EL) 5089
Vitreous Enamel Finishes, Tests for, CH (CH)3405
Wrought Aluminum & Aluminum Alloy Sheet and Strip, CH(NFE)5643

Codes of Practice

Microfilm Practice, Readers and Reels, (PHC)5566
Normal Reinforced Concrete in Buildings, Structural Use of, CP(B)566
Steel in Buildings, Structural Use of, CP (B)565

New Zealand

Black Bolts and Nuts—Part 1: Black Bolts and Nuts, Studs, Lock Nuts and Washers, E71 Part 1, Amendment 2
Produce Sacks, E158 (Revision)
Table-Cut Leather Dress Gloves, E153

Foreign Language Standards

The following standards are available in the language of the country issuing them. Only the titles have been translated into English.

Argentina

Bare Copper Conductors for Aerial Lines, 2004NP
Chalk, 1028P
Copals, 1049P
Dimensions of Countersunk Head Steel Rivets for General Construction, 517P
Dimensions of Countersunk Head Steel Rivets for Ship Construction, 515P
Dimensions of Small Round Head Steel Rivets for Metallic Construction, 520P
Dry (Compound) Fire Extinguishers, 3503NP
Industrial Benzene, 90%, 1016P
Insulating Tape, 2030P
Lithopone, 1004NP
Method of Folding Testing of Metallic Materials at Atmospheric Temperature, 103NP
Porcelain Insulators for Aerial Telecommunication Lines, 4013P
Sampling of Aggregates (for Concrete and Mortar), 1509NP
Screw Sockets (Electric), 2015NP
Silica, 1012NP
Symbols for Electrodes and Magnitudes Relating to Electronic Tubes, 4035P
Turpentine Substitute, 1006NP
White Lead, 1009NP

Denmark

Steel Window Frames:
Small Residential Dwellings, Staalvi.1
Medium Residential Dwellings, Staalvi.2
Large Residential Dwellings, Staalvi.3
Steel Window Frames for Industrial Buildings, Staalvi.5
Surface Protective Treatment of Steel Window Frames and Door Casings, Methods of, Staalvi.6
Two Types of Steel Door Casings, Staalvi.4

Finland

(Text Available in Swedish and Finnish)

Standards

Beer-Bottle, ½ Liter Capacity, R.I.22
Bordeau-Type Wine Bottle, ⅜ Liter Capacity, R.I.19
Bordeau-Type Wine Bottle, ¾ Liter Capacity, R.I.20

Standards (Continued)

Cork-Stopper Type Bottle for Juice, ⅜ Liter Capacity, R.I.10
Cork-Stopper Type Bottle for Juice, ½ Liter Capacity, R.I.11
Cork-Stopper Type Bottle for Juice or Wine, ¾ Liter Capacity, R.I.12
Mineral Water Bottles, R.I.24
Screw-Cap Type Bottle for Brandy, ½ Liter Capacity, R.I.15
Screw-Cap Type Bottle for Brandy, 1 Liter Capacity, R.I.16
Screw-Cap Type Bottle for Juice, ½ Liter Capacity, R.I.6
Screw-Cap Type Bottle for Juice or Wine, ⅜ Liter Capacity, R.I.5
Screw-Cap Type Bottle for Juice or Wine, ¾ Liter Capacity, R.I.7

Draft Standards

Classification of Different Grades of Steel, No. 62/1/42
Skis, No. 65/1/44
Typewriter Key Boards, No. 64/1/43

Reports of the Standardizing Committee on Mineral Oil Products

Cylinder Oils for Steam Engines, Proposed Classification of, #4
Different Grades of Lubrication Oils, Proposed Classification of, #2
Different Grades of Motor Oils, Proposed Classification of, #1
Lubrication Oils for Compressors, Refrigerators and Turbines, Proposed Classification of, #3

France

Copies of an up-to-date list of approved and proposed standards from the French Bureau of Aeronautical Standardization, are now available in the ASA Library for consultation.

Mexico

Bramante, A8-1946
Lead- or Lead Alloy-Coated Copper Wires of Circular Section, J7-1946

Sweden

Brass:
5150, SIS145150
5151, SIS145151
5152, SIS145152
5165, SIS145165
5170, SIS145170
5180, SIS145180
5220, SIS145220
Brass Tubes, Seamless, Round, SIS126310
Brinell Hardness Test, SIS112510
Copper Tubes, Seamless, Round, SIS126300
Dropper Bottles, CSB169
Glass Tips of Dropper, Types A & B, CSB171
Nursing Bottle, CSB166
Nursing Nipple, Rubber Tip of Dropper, Rubber Stopper of Injection Bottle, CSB167
Rectal Thermometer, CSB89
Rockwell Hardness Test, SIS112512
Screw Caps for Dropper Bottles, Types A & B, CSB170
Steel
1300: Commercial Steel, No Special Demands St00, SIS141300
1310: Structural Steel for General Purposes St37N, SIS141310
1311: Structural Steel for General Purposes St37S, SIS141311

NEMA Adds Standards in New Series On Fractional-Horsepower Motors

FOLLOWING its announcement of the new standards for rating fractional-horsepower motors (INDUSTRIAL STANDARDIZATION, November, page 279), the National Electrical Manufacturers Association has now announced completion of additional standards in its new series for small motors. These are standards for the dimensions of the motors, providing for three motor frame sizes, and for numbering the motor frames.

Through the use of the three new standard sizes, NEMA expects that considerable expense and trouble to both manufacturer and user of electrical equipment may be prevented. The great variation in mounting dimensions and over-all size of motors of different makes has been of no little concern to the machinery manufacturer, user, and service man. NEMA announces. To provide for the use of two or three makes of motors in one design of machine, many universal mounting bases, adapter plates, and other arrangements have been devised in the past by machinery manufacturers. On the other hand, NEMA declares, motor manufacturers have many times supplied mounting bases and endplates different from their own in order properly to adapt their motor to a machine already designed for some other make of motor. This has frequently resulted in high costs of tooling and loss of production time. Similar difficulties are experienced by users attempting to replace a motor of one make with that of another make and still obtain satisfactory performance and dependability from the motor-driven equipment, NEMA explains. The new standards, which are expected to help eliminate this difficulty, are entirely voluntary, but it is expected that they will be widely used because of the advantages to all concerned.

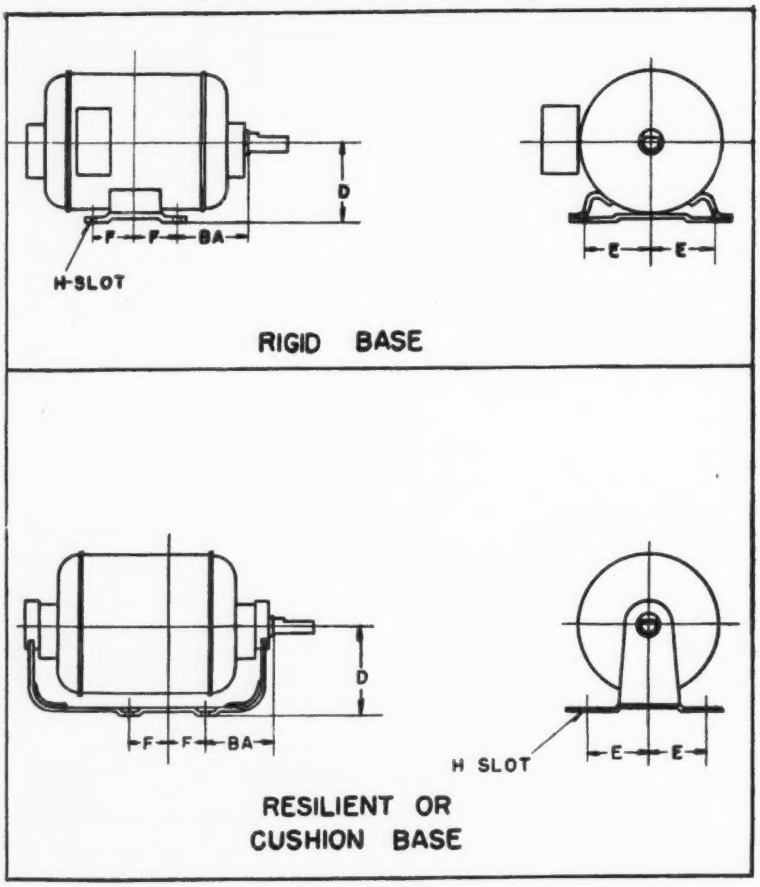
In order to make the new dimensions standards more useful and effective, a standard system of numbering the motor frames also has been proposed. This proposed system has been modeled after the integral-horsepower system which employs frame sizes 203 through 505. Those associated with the application and use of integral-horsepower motors would be the first to give their approval of a similar system for numbering fractional-horsepower frames because of the great success of the numbering system for integral-horsepower motors, NEMA declares. This system has been in use for approximately 16 years.

At the present time each manufacturer of fractional-horsepower motors has a separate and distinct system of frame designations. Some manufacturers employ numbers, some letters, and others a combination of both to designate the various motor frame sizes. There are very few cases of similarity in the numerous systems, and as a result, purchasers and users of fractional-horsepower motors have found them confusing and of very little use, NEMA explains.

In the proposed system for numbering the frames, the frame number will be 16 times the shaft height (D dimension). As indicated in Fig. 1, the three frames will be 42, 56, and 66. The BA, E, F, and H dimensions will be constant for any given "D" dimension or frame size. Suffix letters will be used to indicate the same features now indicated in the integral system, and, therefore, the same frame numbers with proper

Fig. 1

These dimensions apply to both rigid and resilient or cushion-base motors. They apply to motors 1/20 through ¾ horsepower, 1800 revolutions per minute (1 horsepower, 3600 revolutions per minute). The "H" dimension of 13/32-inch slot and "BA" dimension of 3⅛ inches in the largest frame has been established for the purpose of matching the integral horsepower 203 frame (1 horsepower, 1800 revolutions per minute) which has an "H" dimension of 13/32-inch hole and "BA" dimension of 3⅛ inches. This will provide for interchangeability on belt-driven machines, using both fractional- and integral-horsepower motors.



FRAME NUMBER*	DIMENSIONS IN INCHES				
	D	E	F	BA	H
42	2⅝	1 ¾	2 7/32	2	9/32-slot
56	3½	2 7/16	1½	2¾	11/32-slot
66	4⅛	2 15/16	2½	3⅛	13/32-slot

* Frame Number System Is Proposed. See Discussion of "Standard Frame Numbers."

suffix letters would be used for vertical and flange motors as are designated for the horizontal motors of corresponding sizes. Individual manufacturers may use any letter preceding the frame number, but such a letter would have no reference to standardized dimensions. For example, a number 66 frame might be designated as "66" by one manufacturer and as "A66" by another manufacturer, but the D, BA, E, F, and H dimensions of both frames will be identical and will be the values shown in Fig. 1, NEMA explains.

Skramstad Named by NBS As Guided Missiles Chief

The appointment of Dr H. K. Skramstad as chief of the Guided Missiles Section of the National Bureau of Standards has been announced by Dr E. U. Condon, director of the Bureau.

The Guided Missiles Section is concerned with the extended research and development of the advanced forms of guided missiles. The first fully automatic guided missile to be successfully used in combat by any nation was developed by this section in close cooperation with the Office of Scientific Research and Development, the Massachusetts Institute of Technology, and the Navy Department. This missile is the recently declassified and much publicized BAT, a radar-guided bomb, which destroyed many tons of Japanese combatant and merchant shipping during the latter part of the war.

Dr Skramstad received a Bachelor of Science degree from the College of Puget Sound, Tacoma, in 1930 and his doctorate from the University of Washington (Seattle) in 1935. Dr Skramstad came to the National Bureau of Standards in August, 1935, as a physicist in the Aerodynamics Section. Until the outbreak of the war, he was engaged in studies of wind tunnel turbulence and the investigation of the stability of laminar flow, important in the mechanics of air flow over surfaces. In 1942, he became technical assistant to Dr H. L. Dryden, associate director of the Bureau and chief of the Mechanics and Sound Division, in the development of guided missiles, playing a key part in the development of the BAT.

—ASA—
Standards Activities

American Standards

American Standards Approved

Building Exits Code, A9.1-1946 (Revision of A9.1-1942)
Sponsor: National Fire Protection Association

Involute Splines, B5.15-1946 (Revision of B5.15-1939)
Sponsors: American Society of Mechanical Engineers; National Machine Tool Builders' Association; Society of Automotive Engineers; Metal Cutting Tool Institute

National Electrical Code, C1-1946 (Revision of C1-1940)
Sponsor: National Fire Protection Association

Copper-Base Forging Rods (ASTM B124-46; ASA H7.1-1946) (Revision of ASTM B124-45; ASA H7.1-1945)
Sponsor: American Society for Testing Materials

Brass Rod and Bar for Screw Machine (ASTM B16-46; ASA H8.1-1946) (Revision of ASTM B16-45; ASA H8.1-1945)
Sponsor: American Society for Testing Materials

Copper Water Tube (ASTM B88-46; ASA H23.1-1946) (Revision of ASTM B88-45; ASA H23.1-1945)
Sponsor: American Society for Testing Materials

Bedding and Upholstery, L12—
- Definitions (Including Tolerances) for Cotton Filling Materials for Bedding and Upholstery, L12.1-1946
- Definitions (Including Tolerances) for Wool Filling Materials for Bedding and Upholstery, L12.2-1946
- Definitions for Miscellaneous Filling Materials for Bedding and Upholstery, L12.4-1946

Sponsor: National Association of Bedding and Upholstery Law Enforcement Officials

Gas-Burning Appliances—
- Addenda to Approval Requirements for Hotel and Restaurant Ranges and Unit Broilers, Z21.3a-1946
- Addenda to Approval Requirements for Hotel and Restaurant Deep Fat Fryers, Z21.27a-1946

Sponsor: American Gas Association

Photography—
- Internal Dimensions for Radiographic Film Processing Tanks, Z38.8.7-1946
- Internal Dimensions for Deep Tanks for Commercial Photo-finishing, Z38.8.8-1946
- Accuracy of Scales, Graduates, and Thermometers for Use in Photography, Z38.8.9-1946

Sponsor: Optical Society of America

American Standards Withdrawn

Pipe Plugs of Cast Iron, Malleable Iron, Cast Steel or Forged Steel, B16e2-1936
Sponsors: American Society of Mechanical Engineers; Heating, Piping and Air Conditioning Contractors National Association; Manufacturers Standardization Society of the Valve and Fittings Industry

Standards Being Considered for Approval

Steel Socket-Welding Fittings, B16.11
Sponsors: American Society of Mechanical Engineers; Heating, Piping and Air Conditioning Contractors National Association; Manufacturers Standardization Society of the Valve and Fittings Industry

Specifications for Slab Zinc (Spelter) (Revision of ASTM B6-37; ASA H24.1-1943)
Sponsor: American Society for Testing Materials

Prevention of Dust Explosions—
- Code for the Prevention of Dust Explosions in the Plastics Industry (Revision of Z12.16-1945)
- Code for the Installation of Pulverized-Coal Systems (Revision of Z12.1-1945)
- Code for the Prevention of Dust Explosions in the Manufacture of Aluminum Bronze Powder (Revision of Z12.11-1942)
- Code for Explosion and Fire Protection in Plants Producing or Handling Magnesium Powder or Dust (Revision of Z12.15-1945)
- Code for the Prevention of Dust Explosions in Coal Pneumatic Cleansing Plants (Revision of Z12.7-1942)
- Prevention of Dust Explosions in Flour and Feed Mills (Revision of Z12.3-1942)
- Installation of Pulverized Fuel Systems, Z12.17 (applies only to installations prior to 1945; Code on Pulverized Coal Systems applies to new installations)
- Prevention of Dust Ignition in Spice Grinding Plants (Revision of Z12.9-1942)
- Pulverizing Systems for Sugar and Cocoa (Revision of Z12.6-1942)
- Prevention of Sulphur Dust Explosions and Fires (Revision of Z12.12-1943)
- Prevention of Dust Ignitions in Country Grain Elevators (Revision of Z12.13-1943)
- Prevention of Dust Explosions in Wood Flour Manufacturing Establishments (Revision of Z12.8-1942)

Sponsor: National Fire Protection Association

Standards Being Considered for Approval—Continued

Motion Picture Photography—

Theater Projection Rooms (Revision of American Recommended Practice Z22-.28-1941, to be designated as Proposed American Standard Dimensions for Motion Picture Theater Projection Rooms, Z22.28)

Theater Projection Screens (Revision of American Recommended Practice, Z22-.29-1941, to be designated as Proposed American Standard Dimensions for Motion Picture Theater Projection Screens, Z22.29)

Safety Film (Revision of American Recommended Practice Z22.31-1941, to be designated as Proposed American Standard Definition for Motion Picture Safety Film, Z22.31)

Sponsor: Society of Motion Picture Engineers

New Standards Submitted

Specifications for Soft or Annealed Copper Wire (Revision of ASTM B3-45; ASA H4.1-1942)

Bronze Screwed Fittings, 125 Lb, B16.15

Sponsors: American Society of Mechanical Engineers; Heating, Piping and Air Conditioning Contractors National Association; Manufacturers Standardization Society of the Valve and Fittings Industry

Surface Roughness, Waviness, and Lay, B46.1

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

Standards Being Considered for Reaffirmation

Specifications for Hot-Rolled Copper Rods for Electrical Purposes (ASTM B49-1941; ASA H4.7-1942)

Sponsor: American Society for Testing Materials

Preferred Numbers, Z17.1-1936

New Projects Being Considered

Linemen's Rubber Protective Equipment (peacetime project)

Standards for the Office

Rubber Protective Equipment for Electrical Workers (peacetime project)

New Projects Proposed

Standards in Optics

Steel Raceways for Electrical Wiring Systems

Withdrawal of Standards Being Considered

Electrical Indicating Instruments (2½- and 3½-Inch Round Flush-Mounting, Panel-Type), American War Standard, C39.2-1944

Shock-Testing Mechanism for Electrical Indicating Instruments (2½- and 3½-Inch, Round, Flush-Mounting, Panel-Type), American War Standard, C39.3-1943

Dimensions for External Radio-Frequency Thermo-Couple Converters (120 Milliamperes to 10 Amperes, Inclusive), American War Standard, C39.4-1943

External Ammeter Shunts for Panel-Type Instruments, American War Standard, C39.5-1943

News About ASA Projects

Advisory Committee on Ultimate Consumer Goods—

Revision of the scope of Project Z36, Definitions of Terms Used in Retailing, is now being voted upon through letter ballot.

The tentative scope approved in 1937 read: "Standard definitions of terms used in retailing, methods of designating the contents of materials, and technical descriptions of commodities."

When the project was reactivated under the sponsorship of the U.S. Bureau of Labor Statistics, the Bureau suggested that the scope be limited to definitions only.

The scope of the project is now being voted upon to read: "Standard definitions of terms used to describe commodities sold at retail."

Bronze Screwed Fittings, 125 Lb, B16.15—

Sponsors: American Society of Mechanical Engineers; Heating, Piping and Air Conditioning Contractors National Association; Manufacturers Standardization Society of the Valve and Fittings Industry

The types and sizes of 125 lb brass or bronze screwed fittings included in the proposed American Standard for 125 lb bronze screwed fittings just submitted to the American Standards Association for approval are in agreement with schedules of stock items printed in Simplified Practice Recommendation R185-42. This proposal was originally developed by a Committee on Nonferrous Screwed Fittings of the Manufacturers Standardization Society of the Valve and Fittings Industry which was appointed in June 1927. The design developed by this committee and approved by it in September 1930 represented the most economical practice for the recommended service pressure rating, the sponsors report. It was approved as an MSS Standard Practice for Bronze Screw Pipe Fittings, 125 lb (SP-10-1943). As MSS SP-10, it has been in use for more than ten years and has had wide publicity.

Bolt, Nut and Rivet Proportions, B18—

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

As a result of action taken at its meeting September 5, the Company Member Committee has submitted detailed recommendations to the Sectional Committee on Bolt, Nut and Rivet Proportions, B18, for the development of a general purpose bolt standard which might apply where automotive bolts and American Standard semi-finished bolts are now used.

Building Code Requirements for Signs and Outdoor Display Structures, A60—

Sponsors: American Municipal Association; Outdoor Advertising Association of America

A proposed American Standard has been completed by the sectional committee and submitted to the sponsors for recommendation to the American Standards Association.

Dust Explosion Hazards, Z12—

Sponsor: National Fire Protection Association

The request of the U. S. Department of Agriculture that its resignation as joint sponsor of the project on Prevention of Dust Explosion Hazards be accepted has been approved by the Safety Code Correlating Committee. This leaves the National Fire Protection Association as sole sponsor.

Electrical Indicating Instruments, C39—

Recommendations of the sectional committee that the four American War Standards developed for the use of the Army and Navy should be withdrawn have been referred to the Electrical Standards Committee. Each of these American War Standards has been adopted as a JAN specification. When they were developed, the military rather than the commercial purposes were emphasized, and the rigid requirements for vibration, temperature, abuse, etc, are not necessarily applicable to general industrial use. Consequently, the sectional committee has voted to recommend that the American War Standards be withdrawn and work started on new regular American Standards. The standards in question are: Electrical Indicating Instruments (2½- and 3½-Inch, Round, Flush-Mounting, Panel-Type), C39.2-1944; Shock-Testing Mechanism for Electrical Indicating Instruments, (2½- and 3½-Inch, Round, Flush-Mounting, Panel-Type), C39.3-1943; Dimensions for External Radio-Frequency Thermo-Couple Converters (120 Milliamperes to 10 Amperes, Inclusive), C39.4-1943; External Ammeter Shunts for Panel-Type Instruments, C39.5-1943.

Glass Bulbs and Moulded Glass Flares for Use in the Manufacture of Electric Lamps and Electron Tubes—

A letter ballot is being taken of the Electrical Standards Committee on the initiation of a project covering the establishment of a national system of nomenclature for glass bulbs and moulded glass flares.

The Committee on Scope of the ESC considered the request for this project by the Joint Electron Tube Engineering Council, and recommended that the ESC initiate a project on the standardization of glass bulbs and moulded glass flares for use in the manufacture of electric lamps and electron tubes under its sponsorship.

The ESC is voting on a list of twelve organizations to be represented on this sectional committee and also on the following scope for the project:

"Nomenclature and designation for glass bulbs, moulded glass flares and other glass component parts used in the manufacture of electric lamps and electron tubes."

Motion Pictures, Z22—

Sponsor: Society of Motion Picture Engineers

Four new proposed American Standards for cutting and perforating dimensions for 16-mm silent and sound motion picture negative and positive raw stock, for 8-mm motion picture negative and positive raw stock, and for 35-mm motion picture positive raw stock are being voted on by the sectional committee.

Safety Code for Bakery Equipment, Z50—

Sponsor: American Society of Bakery Engineers

The first draft of the Safety Code for Bakery Equipment has been sent out to the members of Sectional Committee Z50 for comment.

Screw Threads, B1—

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

Following the Conference on Unification of Engineering Standards held in Ottawa in 1945 between delegates from Great Britain, Canada, and the United States, studies of the proposals for the unification of the American and British national standard systems of screw threads, tentatively agreed on at Ottawa, have been going forward in the three countries. One of these proposals concerns the adoption of a new basic form of thread, the thread on the screw to have a rounded root and either a rounded crest (as preferred by the British) or a truncated crest (as preferred by the Americans).

A study of this proposed so-called ABC thread form by the ASA Sectional Committee on Screw Threads, B1, has led the committee to suggest certain changes in the proposal as originally formulated at Ottawa. The revision proposed by the committee was discussed in September at London by Harry T. Woolson, executive engineer of the Chrysler Corporation, and William Batt, chairman of the Advisory Council of the Joint Sponsors of the Screw Thread Project, who attended several meetings with a group of British experts. Mr Batt also addressed the Institution of Mechanical Engineers on the subject of Unification of Engineering Standards. As a result of these discussions, it was agreed that a solution agreeable to both the British and the Americans might be found if gaging specifications were formulated so as to cover threads with rounded crests, as well as threads with truncated crests on the screw. In accordance with a suggestion by the British group that an American mission of technical experts go to England to discuss this problem in further detail, the following representatives of American industry have left on a trip to England for further conferences with the British:

George S. Case, chairman of the Board, Lamson and Sessions Company
Frederick S. Blackall, Jr, president and treasurer, Taft-Peirce Company
Wm H. Gourlie, standards engineer, The Sheffield Corporation
Frank P. Tisch, chief engineer, Pheoll Manufacturing Company

A newly appointed subcommittee, on Screw Thread Gages and Gaging, of the Sectional Committee on Screw Threads, met in Detroit October 10 and formulated recommendations for the guidance of the technical mission in its discussions with the British group.

Comments on the proposed revision of American War Standard, Screw Threads of Truncated Whitworth Form (American Truncated Whitworth Threads), have been received from the British Standards Institution. It is expected that final agreement with the British and Canadians on the final form of these revisions may soon be reached. This American War Standard is not intended to be converted into an American Standard. The revision is undertaken solely to harmonize this American War Standard with the revised British Standard on Screw Threads of Whitworth Form.

Specification for Slab Zinc (Spelter) (ASTM B 6-37; ASA H24.1-1943)—

Sponsor: American Society for Testing Materials

A revision reducing the maximum permissible lead and cadmium each by 0.001 percent and adding a note regarding tin has been adopted by the American Society for Testing Materials, which acts as proprietary sponsor for this standard. As proprietary sponsor, the Society assumes the responsibility under its own procedure for the review and revision of the standard. The Society has asked the American Standards Association to approve the revised standard as American Standard under the proprietary sponsorship method.

Standards in Optics—

A project to develop basic standards for terminology, definitions, and specifications in the general field of optics has been requested by the Optical Society of America. Such a project, the Society suggests, should include not only terminology, definitions, and specifications, but should also go into the psychophysics of vision (the scientific study of the relations between mental and physical processes affecting vision). It should also establish methods of testing, rating, and classifying performance characteristics of materials and devices used in optics, including the specification and description of color, the Society recommends. This request is being referred to the Board of Examination for recommendation to the Standards Council.

Steel Raceways for Electrical Wiring Systems—

The Subcommittee on the Electrical Distribution Systems, Committee on Building Codes, of the American Iron and Steel Institute, acting on behalf of its sponsoring group of manufacturers of electrical conduit, has requested the American Standards Association to initiate a project on standards for steel raceways for electrical wiring systems.

The request recommends that the scope of the project cover specifications, including tolerance requirements, threading data, and bushings, elbows, and other component parts of a steel raceway wiring system. The request has been referred to the Electrical Standards Committee.

Surface Qualities, B46.1—

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

A proposed American Standard, Surface Roughness, Waviness, and Lay, submitted by the sponsors to the American Standards Association for approval, is being sent to the Mechanical Standards Committee for recommendation to the Standards Council. The proposed standard covers definitions of terms used in rating surfaces, specifications and ratings, measurement and evaluation, preferred values of roughness and waviness, and standard symbols. The committee has been working on this proposal for 14 years. Each step of its work has received full publicity, with hundreds of copies of drafts distributed for comment and criticism, the sponsors report.

Transmission Chains and Sprockets, B29—

Sponsors: American Society of Mechanical Engineers; Society of Automotive Engineers

The recommendation of the Executive Committee of the Mechanical Standards Committee that the MSC approve the request of the American Gear Manufacturers Association that it be permitted to withdraw as joint sponsor for the project, Transmission Chains and Sprockets, B29, went into effect as a decision of the entire MSC on October 22.

Abrasive Wheel Code Protects Workers

"While grinding metal stock on an emery wheel, a sheet metal worker (3 years' experience) shifted position of stock to avoid hitting a looker-on alongside him. The wheel in motion caught the edge of his hand, jammed it down into the wheel frame, amputating the thumb.

"Chalk this one up to inadequate guarding and improper use of abrasive grinders. Follow the ASA Code* 'The Use, Care and Protection of Abrasive Wheels'."

—*Safety Engineering*

* The American Standard Safety Code for the Use, Care and Protection of Abrasive Wheels, B7-1943.

Trichloroethylene

the latest in the series of 17 nationally accepted standards for the

Allowable Concentration of Toxic Dusts and Gases

in work places

Prepared by a committee of nationally recognized experts, these 17 standards define the maximum limit of the dust or gas that can safely be permitted in the air of work places, for:

Carbon monoxide
Hydrogen sulfide
Carbon disulfide
Benzene
Cadmium
Manganese
Chromic acids and chromates
Mercury
Metallic arsenic and arsenic trioxide
Xylene
Lead and certain of its inorganic compounds
Toluene
Oxides of nitrogen
Methanol
Styrene monomer
Formaldehyde
Trichloroethylene

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